OCTOBER 22, 1951

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

Let's Do Something About the Shortage of Engineers

—see page 41

OLD TIN CANS
. . . *New Future in Briqueting, p. 52*

MACHINING TITANIUM
. . . *More Difficult than Stainless Steels, p. 74*

SUPERSONIC RESEARCH RESULTS
. . . *Cooler Turbine Blades, Buckets, p. 78*

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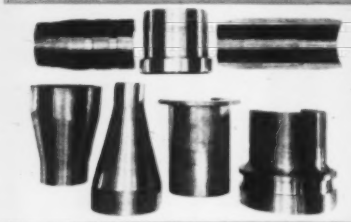
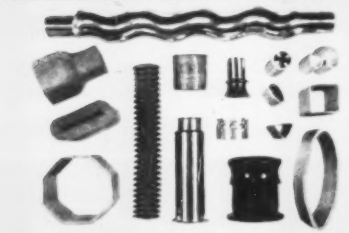
SPUN



UPSET

SWAGED and EXPANDED

BENT



FORMED

let's take a CLOSER LOOK at Fabrication Requirements

If you make hollow parts the economical way—from tubing—chances are you have one or more fabricating problems. This typical array of parts illustrates the wide range in severity of working that is involved in such operations as spinning, swaging, expanding, upsetting, bending, and forming. A corresponding diversity exists in the type, grade, finish, and mill condition of seamless and welded steel tubing used for their manufacture.

Remember, tubing is more than bar stock with a hole in it. It is a semi-finished product. B&W's ability to match its tubing to a myriad of end uses may enable you to make a better product . . . easier. Ask Mr. Tubes—your B&W Tube Company Representative—for help in selecting the tubing that is best for *your* fabricating requirements. Request a copy of Bulletin TB-324.

TA-1641-M

B&W SEAMLESS and WELDED TUBES

THE BABCOCK & WILCOX TUBE COMPANY

Executive Offices: Beaver Falls, Pa.

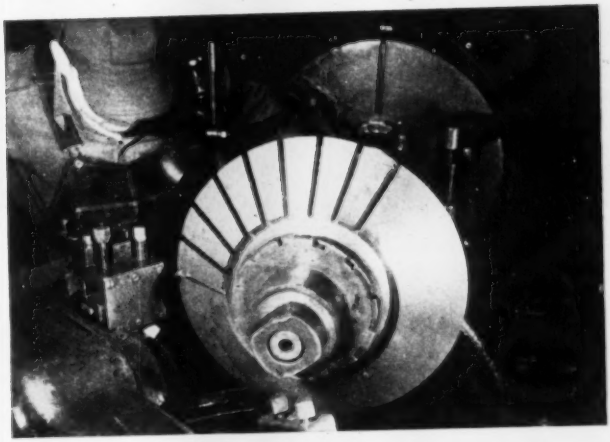
General Offices & Plants

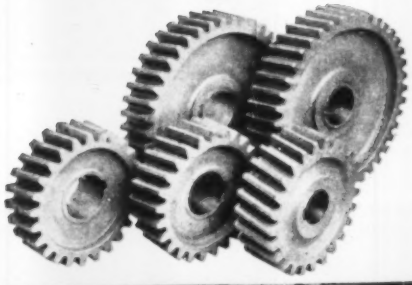
Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing

Alliance, Ohio—Welded Carbon Steel Tubing

Sales Offices: Beaver Falls, Pa. • Boston 16, Mass. • Chicago 3, Ill. • Cleveland 14, Ohio • Denver 1, Colo. • Detroit 26, Mich. • Houston 2, Texas • Los Angeles 17, Calif. • New York 16, N.Y. • Philadelphia 2, Pa. • St. Louis 1, Mo. • San Francisco 3, Calif. • Syracuse 2, N.Y. • Toronto, Ontario • Tulsa 3, Okla.

STRONG, CLEAN, Easy TO WORK WITH





Gear blanks made by Bethlehem's rolling-and-forging process are heavy-duty products intended for applications where shocks, stresses and strains are unusually severe. These blanks have to be—and are—very strong; in fact, their high strength frequently makes possible the use of thinner sections.

But strength isn't the whole story. There are other points . . . points that can save important production time. For instance, the metal in Bethlehem gear blanks is clean, solid; the density is uniform, the grain structure good. Hence you have a blank that enables the machinist to work confidently and swiftly. He is able to take his cuts without fear of hidden trouble.

The high quality of Bethlehem blanks is due largely to two factors: good steel, and the rolling-and-forging process referred to above. The blanks are made in a mill that first upsets, then rolls and forges in a single operation, thereby setting up the most desirable grain flow.

Bevel, spur, and miter gears are among the types made with great success from these sturdy blanks, which range in size from approximately 10 to 42 in. OD. Numerous examples are shown in illustrated Booklet 216. Write for a free copy; it will be mailed upon request.

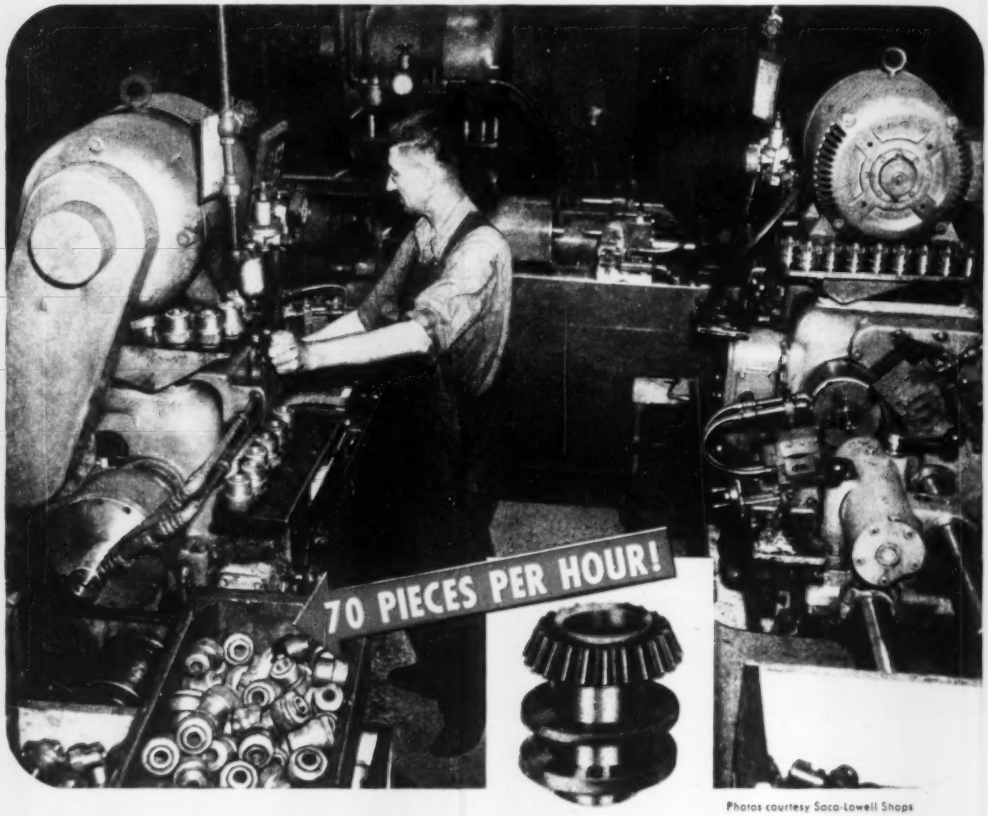
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM ROLLED-AND-FORGED CIRCULAR PRODUCTS

FACTS on improving production!



Photos courtesy Saco-Lowell Shops

Saco-Lowell Shops, prominent builders of up-to-the-minute textile machinery, solved a production problem by using Jones & Lamson Fay Automatic Lathes to machine bobbin gear blanks. These meehanite castings are completely turned, formed and bored at the rate of 70 pieces per hour on three 8" Fay Automatic Lathes.

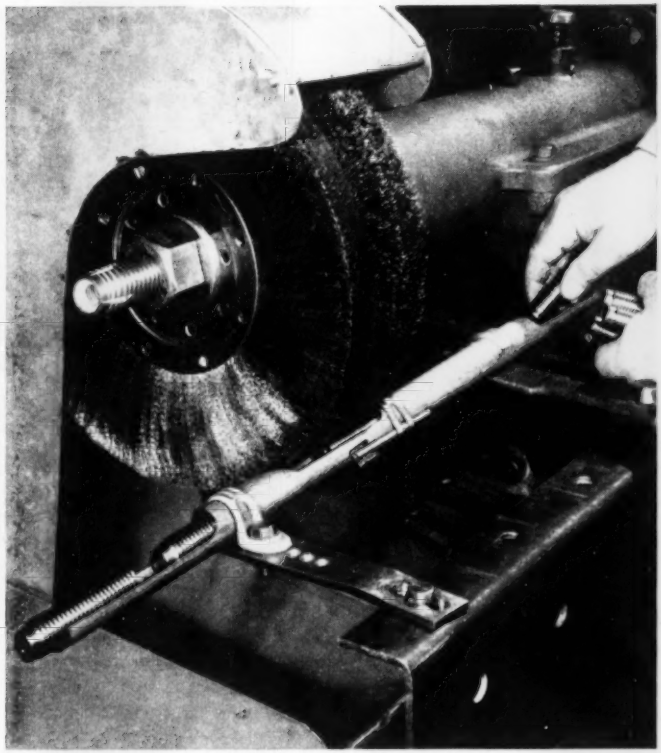
THESE LATHES ENABLE A SINGLE OPERATOR TO MEET THE REQUIRED PRODUCTION RATES.

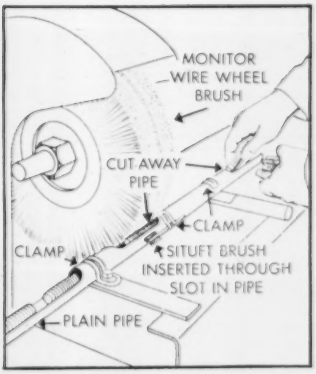
Now, more than ever, the most efficient machines and methods are needed to make the most of your available manpower and material. Jones & Lamson is ready, willing and able to help you get maximum results from your turning, threading and inspection operations. Write *today* to Department 710 FOR THE NEW 8" FAY CATALOG

Turret Lathes—Fay Automatic Lathes—Thread Grinders—Optical Comparators—Threading Dies

JONES & LAMSON
MACHINE COMPANY
Springfield, Vermont, U.S.A.

Machine Tool Craftsmen Since 1835





THE FIXTURE. This sketch shows how to make pipe fixture for deburring and polishing small parts, threaded or smooth. Can be made of steel, fiber or plastic tubing.

How to find an 800% production increase in a piece of pipe

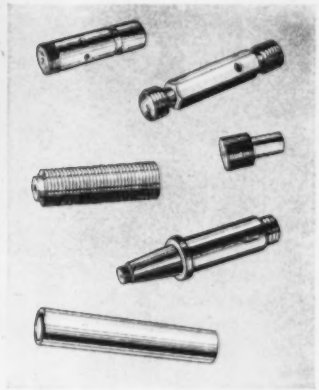
You can save manpower and money in countless ways when you tap the idea resources of power brushing. For example:

It took 18 seconds to clean the threads of the 2½ x ¼-inch set screws shown above. Time was cut to 2 seconds with Osborn Power Brushing by divising the simple pipe fixture shown. The operator feeds the screws in one end of the pipe and an Osborn brush makes contact with the work at a slot cut in the pipe, spinning and cleaning the threads uniformly. A little stationary wire brush, inserted as shown through the pipe, controls rotation and traverse of the work.

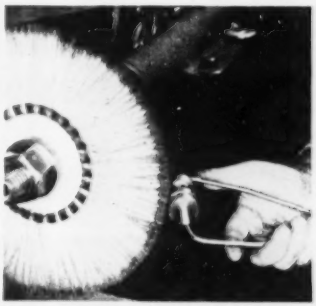
Have your **O**sborn **B**rushing **A**nalyst help you develop and apply output-increasing ideas to *your* cleaning and finishing operations. Call now or write *The Osborn Manufacturing Company, Dept. 544, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

OSBORN

LOOK FOR THE NAME OSBORN . . . RECOGNIZED EVERYWHERE FOR QUALITY WORKMANSHIP AND MATERIALS



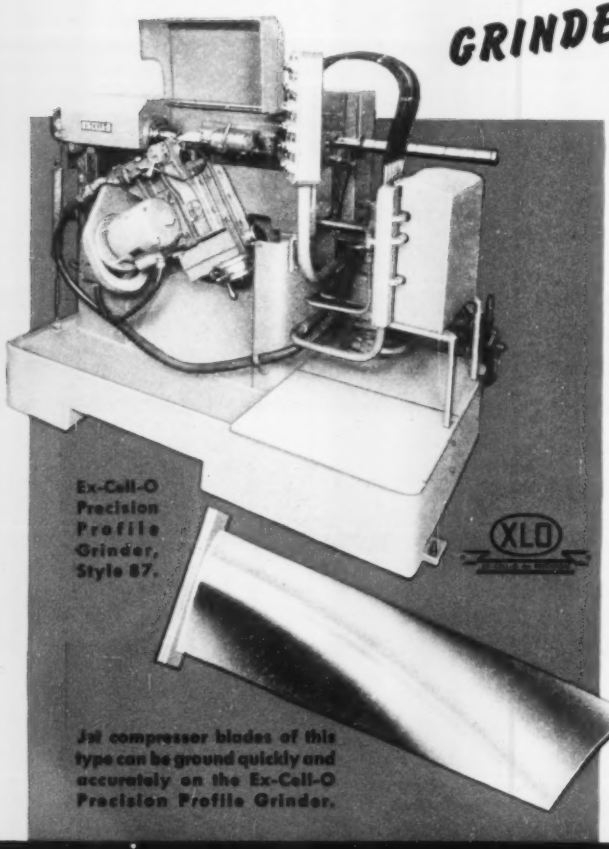
TYPICAL PARTS. Set screws, pins, pieces of tubing and other parts such as these can be cleaned and finished in the pipe fixture or in the forceps shown below.



ANOTHER SIMPLE APPROACH. For small parts such as bushings, a simple forcep fixture can be devised to hold parts for power brushing. This one is made of wire.

Ex-Cell-O

PRODUCTION-PROVED GRINDER FOR JET BLADES



Ex-Cell-O Precision Profile Grinder, Style 87.

Jet compresser blades of this type can be ground quickly and accurately on the Ex-Cell-O Precision Profile Grinder.

AUTOMATICALLY GRINDS COMPLETE AIRFOIL . . .

Performance proved in actual shop production the Ex-Cell-O Precision Profile Grinder, Style 87, now is available to shops finishing turbojet engine blades. This machine grinds the complete airfoil form, including leading and trailing edges, in an automatic cycle. Accuracy is assured by use of a master cam made from the engineers' 20-1 layouts.

Operator loads the blade and presses the start button. As the blade rotates and traverses in contact with the grinding wheel the work speed changes automatically—faster on the thin edges and slower on the broad sides of the blades—to produce an accurate contour and uniform finish.

If you would like further information and specifications on the Ex-Cell-O Precision Profile Grinder, please write, wire or phone to Ex-Cell-O in Detroit.

EX-CELL-O CORPORATION DETROIT 32, MICHIGAN

EX-CELL-O'S COMPLETE LINE OF STANDARD MACHINES FOR FINISHING JET BLADES: STYLE 85, FOR GRINDING THE ROOT FORM—STYLE 86, FOR MILLING THE AIRFOIL—STYLE 87, FOR GRINDING THE AIRFOIL—STYLE 88, FOR POLISHING THE AIRFOIL

MANUFACTURERS OF PRECISION MACHINE TOOLS CUTTING TOOLS • RAILROAD PINS AND BUSHINGS DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

51-5

STEEL
The Weekly Magazine of Metalworking

VOL. 129 NO. 17 OCTOBER 22, 1951

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Editorial and Business Staff—Page 10. Advertising Index—Page 156. Editorial index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

Next Week **... Using the Atom in Industry ... Stainless Jet Engine Stampings Mass-Fabricated on Production Line ... Plating Room Controls Cut Operating Costs, Curb Stream Pollution ... Overhead Handling Facilitates Auto Seat Spring Production**

Published every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, Ohio. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $20. Single copies (current issues) 50 cents. Metalworking Yearbook issue $2.00. Entered as second class matter at the postoffice in Cleveland, under the Act of March 3, 1879. Copyright 1951 by Penton Publishing Co.

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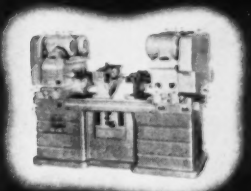
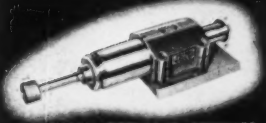
EX-CELL-O for PRECISION



PRECISION MACHINE TOOLS

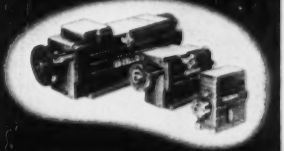
CONTINENTAL CUTTING TOOLS



PRECISION GRINDING SPINDLES

DRILL JIG BUSHINGS

AIRCRAFT AND PRECISION PARTS



HYDRAULIC POWER UNITS

Products of
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CORPORATION
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CLEAR UP YOUR Grinding Jobs with the Right PELRON GRINDING COMPOUND

PELRON GRINDING COMPOUNDS, water soluble, produce a clear solution that not only prevents loading the finest grit wheel, but facilitates the work by enabling the operator to see the piece at all times.

PELRON GRINDING COMPOUNDS provide all the other desirable features of a grinding compound: excellent detergent properties, rapid settling of chips and grind particles, high rust preventive quality, stable in emulsion, neutral to the skin.

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Write us regarding your special problems. We're always "looking for trouble"—with the object of licking it, reducing *your* worries, increasing *our* experience.

Get in touch with our nearest office.

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7740 W. 47TH STREET
LYONS, ILLINOIS

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Behind the Scenes...

Cover Story

Today's cover, done most competently by Artist Robin Allen, is a typical example of how most STEEL covers get born. The idea for the story on the engineering shortage was crystallized six weeks ago at an editorial conference. Five weeks ago the story outline was passed along to Bill Kellogg and his artists. Five rough layouts were made, all discarded. A sixth one showed promise, so a more comprehensive layout was made. At an editorial conference three weeks ago, the comprehensive was vetoed, primarily because it didn't illustrate the major tack the story was taking.

Robin Allen came up with a layout that hit the bull's eye on Oct. 4. The finished art was ready for the engravers on Oct. 5. The plates came back Oct. 11. The final printing job on the cover was finished with a coat of varnish last Thursday, Oct. 18.

The story on the shortage of engineers, to which the cover refers was written by Associate Editor Ed Birkner.

New Thought

A woman called up the Better Business Bureau to report on what she thought was a nonexistent dry cleaning firm. That company had given her its street address as 220. When she had checked she had found only the numbers 219 and 221. The bureau asked if she had looked on the opposite side of the street for the even number. "I never thought of that," she reported.

On Telephone Directories

We were doing a little research the other day among the telephone directories. For the use of the editors is a collection of hundreds of the things from every place in the U.S. and Canada you ever heard of.

They reminded us that the time has come for our annual telephone directory sweepstakes. This year, as last, we find that the largest directory of personal names is the Chicago volume which has 2132 pages. New York is not the winner, as you might have thought, because the directories there are split up among the boroughs. The smallest directory we could find in a spot check was from Mason, Mich., only $4\frac{1}{4}$ pages.

The winner last year and the winner this, with the personal name that's bound to lead off any directory in North America, is one Herbert Aa of Brooklyn, N. Y. As we recall, the name that turned up a year ago as the one most likely to end any telephone directory belonged to one Ziggie Zzyx of San Francisco. We have one to beat that now—Ricardo Zzyzz, found ending the listings in the Los Angeles volume.

We looked and looked, but nowhere could we find any telephone reference to Shrdlu. The fellow just doesn't have a phone.

Vulcan in Birmingham

A. J. Day of Tennessee Coal, Iron & Railroad Co. writes to chide us about our ignorance concerning Vulcan as the god of metalworking. He informs us that if we lived in Birmingham we would have been as familiar with that fact as the most erudite scholar, for Vulcan's statue, the second largest in the country, stands atop Red Mountain in Birmingham. He was cast in 1903 and erected at the St. Louis World Fair, but later removed to the mountain of red ore from which he was made.

Puzzle Corner

The two puzzles in our Oct. 8 issue were taken in stride by you puzzle addicts. The mirror must be three feet high regardless of distance. The price of the casks is 120 francs each, and the tax is 10 francs per cask. First in with the correct answers were L. B. Shapleigh and Roger I. Fluck of Bethlehem Steel Co., Robert W. Huff of Canton, O., Paul C. Smedley of Ohio Crankshaft Co., L. W. Davis of the Corps of Engineers' Fort Worth District, Albert Romeo of Dennison Engineering Co. and J. N. Hutson of Electric Controller & Mfg. Co.

Here's a problem sent in by L. A. Dellasega of Phillips Petroleum Co. at Bartlesville. A man has 12 coins and a set of balance or justice scales. He knows that one of his 12 coins is phony, but he doesn't know whether it is lighter or heavier than a true coin. The 11 true coins weigh exactly the same amount. How can he find the bad coin, determining if it is lighter or heavier than a true coin in three and only three separate weighings?

Shrdlu

(Metalworking Outlook—Page 33)

Wellman will build it

Special Cranes
Soaking Pit Cover Carriages
Gas Producer Plants
Ore Bridges
Charging Machines
Industrial Furnaces
Gas Reversing Valves
Coke Pushers
Mine Hoists
Skip Hoists
Clamshell Buckets

→ Wellman soaking pit cover carriages

for smooth operation...long life

In this Wellman Two-Motor Carriage, one motor raises the cover and the other motor moves the carriage.

● Of rigid welded steel construction, with liberal use of anti-friction bearings, Wellman Soaking Pit Cover Carriages are recognized for their smooth, efficient performance and long trouble-free service. The installation shown above is part of a total of 46 units which are serving one large steel company. Available in various types and sizes to suit the application. Write for free bulletin No. 143.

THE WELLMAN ENGINEERING COMPANY

7029 CENTRAL AVENUE • CLEVELAND 4, OHIO

Now...36 Pieces Threaded Instead of 1

OTHER INDIRECT SAVINGS IN TOOL COST AND TOOL INVENTORY

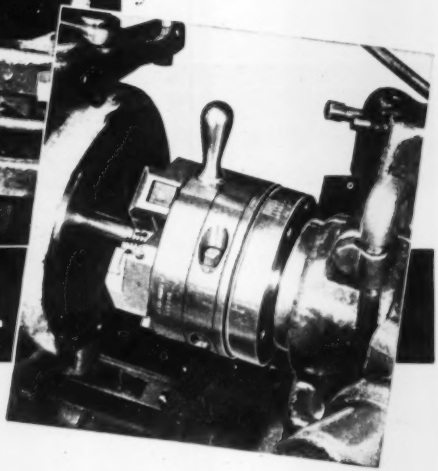
This manufacturer had cut threads on adjusting screws in the past by making several passes with a single point tool. Actual chasing time on the .623 in. diameter 8 pitch thread 1 3/8 in. long was 4.86 minutes.

LANDMATIC Die Heads were installed to perform these operations. Immediate savings were realized when actual threading time was cut to 8 seconds.

LANDMATIC Die Heads are well-suited to cutting these modified square threads. Rigid construction holds the chasers firmly—line contact with the work reduces friction and cutting strains—thus making it possible to produce the thread in a single pass.

Other savings accrued from LANDMATIC Heads. Interchangeable chasers can be reground singly, and for over 80% of their length. A single chaser can be replaced in the set. Chasers will maintain a more consistent thread form than a single point tool.

For more information about these cost-cutting tools, write for Bulletins F-80 and F-90.

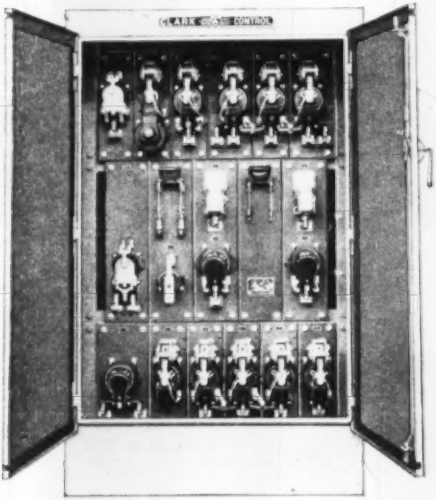


LANDIS *Machine* CO.

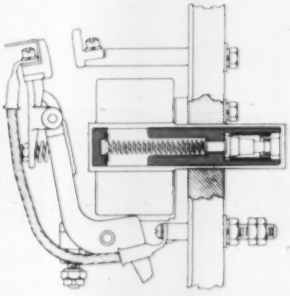
WAYNESBORO • PENNSYLVANIA • U. S. A.

CLARK CRANE CONTROL

WITH THE FAMOUS VARI-TIME PRINCIPLE



Clark Bulletin 9135, 230 Volt DC Reversing Dynamic Hoist Control, with protection, NEMA 1A SAFE-EDGE Cabinet, with PAN-TYPE DOORS.



Cross Section of VARI-TIME Contactor, showing operating principle.

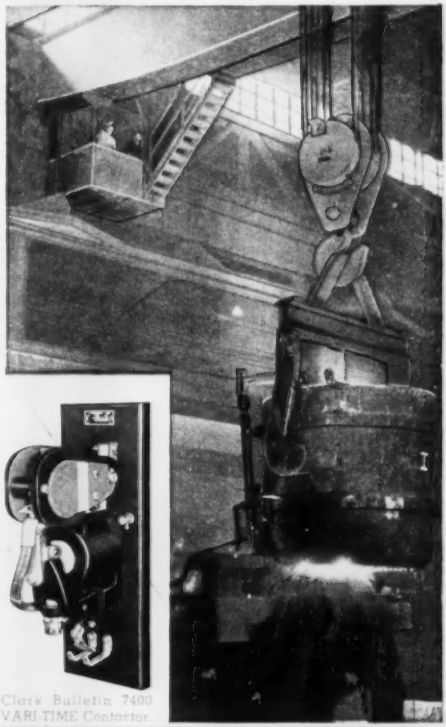
- Famous for over 20 years, CLARK VARI-TIME Contactors have had an inherent, adjustable time delay feature.
- Many accelerating relays are eliminated, thus lowering maintenance, and providing wiring simplicity.
- In active use for over 20 years, *no* VARI-TIME *element has ever needed repairs.*
- Thus every VARI-TIME *element is guaranteed for the life of the control.*

CLARK full magnetic Crane Controls are supplied in Unit Panel Construction as shown above, or in large panel assemblies. These Crane Controls are made in 3 standard over-all heights, and in Vault-Type cabinets with Pan-Type doors.

CLARK *dependable* Crane Controls are in use on all types of mill cranes including Ore Bridges, Hot Metal Cranes, Soaking Pit Cranes and Stripper Cranes.

CLARK CRANE CONTROL PROVIDES

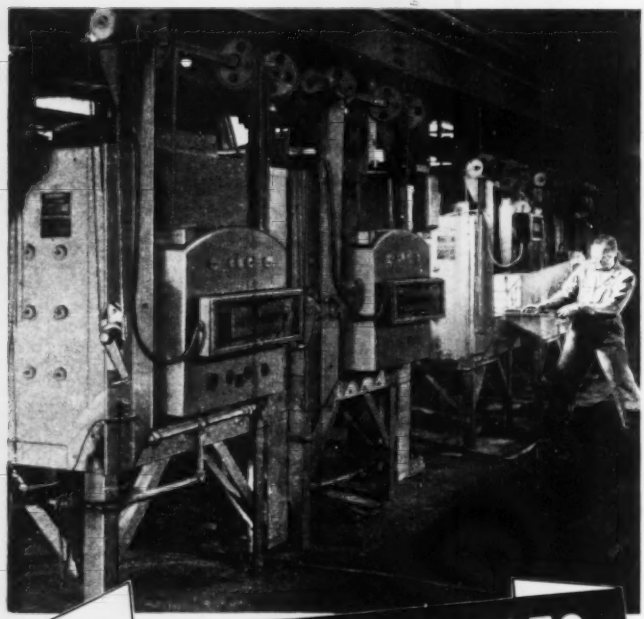
- Definite VARI-TIME acceleration, hoisting and lowering.
- Slow SPOTTING speed, both "hoist" and "lower".
- High speed no-load hoisting and lowering.
- Over speed protection on final point.
- High torque per armature ampere by field forcing.
- Dynamic braking on "OFF" point.
- A circuit of EXTREME simplicity.
- Inherently stable operation.



Clark Bulletin 7400 VARI-TIME Contactor.

THE CLARK CONTROLLER CO.

ENGINEERED ELECTRICAL CONTROL • 1142 EAST 152ND STREET, CLEVELAND 10, OHIO



HEVI DUTY FURNACES
In Tool Room Service
Are Versatile . . . . . and Dependable

● These Hevi Duty Box Furnaces at the A. O. Smith Corp. of Milwaukee, Wisconsin are used for hardening production tools that vary in weight from a few ounces to several hundred pounds. Hevi Duty Furnaces provide the uniform temperatures needed for precision heat treating.

Send for bulletins HD-341 and HD-441

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVI-DUTY ELECTRIC EXCLUSIVELY

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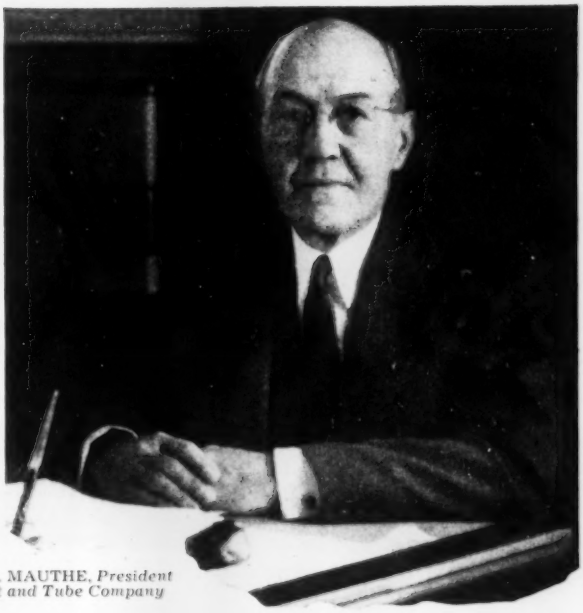
Why is the **scrap** situation so **critical?**



An interview with J. L. MAUTHE, President
The Youngstown Sheet and Tube Company

Why are you concerned about iron and steel scrap, Mr. Mauthe?

Our inventories are critically low and the present scrap flow is not sufficient to maintain capacity steel plant operations. Furthermore, if the flow of scrap is not increased, a curtailment of steel production is inevitable.

The industry is using all the pig iron and all the home scrap that is available. The balance of our metallic requirements must be made up through procurement of purchased scrap. Every ton of scrap that we do not get represents a ton of steel that we cannot make.

How much scrap does the industry need?

In 1950, 96,700,000 tons of steel ingots and castings were produced, requiring over 61,000,000 tons of iron and steel scrap.

In 1951, over 65,000,000 tons of scrap will be required, and even more will be needed in 1952.

Where does scrap come from?

About 58% of the total scrap required is produced by the ingot and casting makers, and is known as "home" scrap; the balance of 42% is "purchased" scrap and is procured from outside sources.

Purchased scrap generally falls into two categories: Scrap from current fabrication and that which is the result of obsolescence.

There are three important sources from which we get obsolete scrap, much of which is dormant:-

1 - Obsolete machinery and equipment in every industrial plant, at the oil fields and on the farms.

2 - Battlefield scrap, obsolete ships and war material, surplus machinery and equipment, which government can make available.

3 - Countless old automobiles and trucks, which are rusting away in automobile wrecking yards in every section of the country.

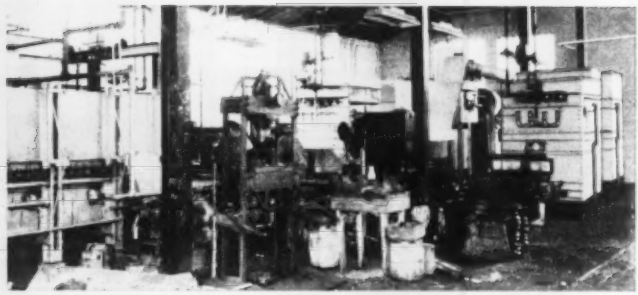
What can be done to increase tonnage of purchased scrap?

This scrap must be made available immediately! All industry and government must awaken to the critical nature of the situation. They must realize that if we do not get the scrap, they will not get the steel!

YOU CAN HELP - YOU MUST HELP!
NO SCRAP - NO STEEL

QUALITY YOUNGSTOWN SERVICE

The Youngstown Sheet and Tube Company - Youngstown, Ohio



Niagara Aero Heat Exchanger quickly pulls down the initial peak load of heat in quenching . . . and saves cooling water

Accurate control of quench bath temperatures and quickly effective capacity to handle the initial peak load of heat in quenching prevents production set-backs, increases the output of your heat treating department, prevents oil fires, saves you losses from rejected parts.

Niagara Aero Heat Exchangers give you this control in both furnace and induction hardening methods. They prevent both over-heating and over-cooling of the quench bath. Hundreds of heat treaters know they prevent many troubles, constantly improve quality and increase production.

They quickly pay for themselves by saving cooling water coils and extend your quench capacity without extra water or cooling tower.

Write for Bulletin #120 giving complete information.

NIAGARA BLOWER COMPANY

Over 55 Years' Service in Industrial Air Engineering

Dept. S, 405 Lexington Ave. **New York 17, N. Y.**

Experienced District Engineers in all Principal Cities

LETTERS
TO THE EDITORS

There's a Difference

I have noted the last section in your editorial "In Minutes, Not Hours"—(STEEL, Sept. 17, p. 52). Apparently your figures are taken from the article "Continuous Heat Treatment Improves Pipe Physical Properties" by C. A. Turner Jr. of Sclas Corp., reported in STEEL, p. 97, of the same issue.

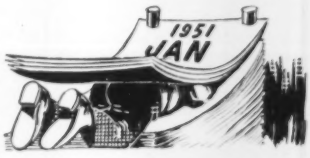
We do not think a comparison between batch heat treatment times and continuous heat treatment times is fair. We believe Mr. Turner's figures on batch heat treatment refer to heavy alloy sections of over 2-inch wall and are not directly comparable to the thin walled tubes described in his article.

R. J. Stoup, plant metallurgical engineer
Spang-Chalfant Division
National Supply Company
Ambridge, Pa.

Complaint Answered

You fellows out there are always so nice to us subscribers. If there is one complaint I would voice, it is that you don't seem to know that I lack month-by-month figures on commercial steel forgings shipped and tonnage of unfilled orders from 1940 through 1947. I am not asking you to look through back issues and send me the dope, but, brother, would I be pleased if you did!

E. J. Vranicar, general manager,
John H. Sipchen Co.
Chicago



• *The best figures we have available from July, 1943, through 1947 have been sent, brother Vranicar.*

Covering Cold Extrusion

We will appreciate information or descriptive literature in connection with any publications that cover cold extrusion or cold forming steel.

J. K. Sherman
Ambrif Corporation
Stamford, Conn.

• *A series of articles that appeared first in STEEL and later in "Modern Ordnance Production" is enclosed, with several news stories dealing with cold extrusion from STEEL.*

We Can, We Will, We Have

Can STEEL's statistical section send us the latest data regarding tin plate production facilities in the United States?

E. E. Frost, assistant to the president
Vulcan Detinning Company
Sewaren, N. J.

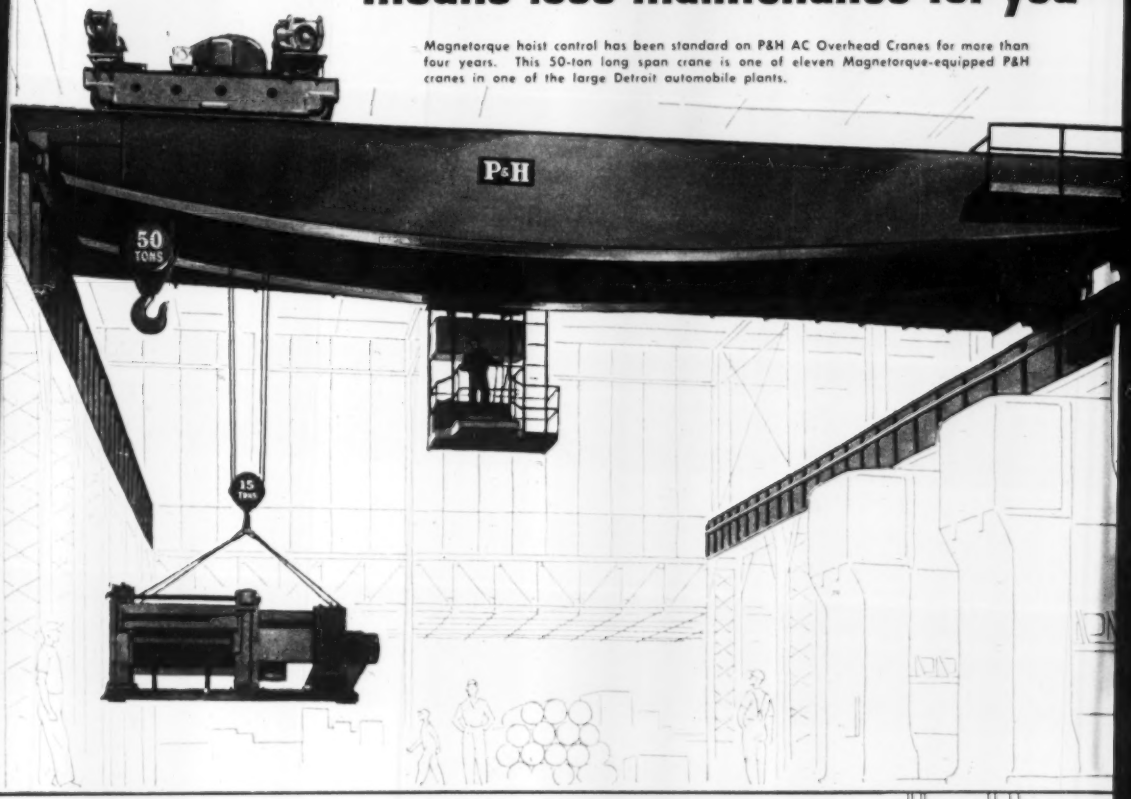
• *Please refer to STEEL, Oct. 1, p. 132 for this information. Reprints are available on request.*

P&H OVERHEAD CRANES

MAGNETORQUE*

means less maintenance for you

Magnetorque hoist control has been standard on P&H AC Overhead Cranes for more than four years. This 50-ton long span crane is one of eleven Magnetorque-equipped P&H cranes in one of the large Detroit automobile plants.



P&H Magnetorque AC hoist control operates electro-magnetically — without friction or wear. It eliminates the mechanical load brake with its need for adjustment and relining. Trouble-free and dependable, Magnetorque gives you smoother speed regulation than is possible with DC dynamic control *under all load conditions.*

With Magnetorque 5-step full magnetic or 8-step drum control, inaccurate "inching" for fractional lowering or hoisting is unnecessary. It operates on both hoisting and lowering. All this — and lower maintenance — is yours when using Magnetorque with your convenient AC power supply.

P&H Overhead Cranes serve you best when you have *all* the genuine P&H components — controls, motors, switches, P&H *balanced design* assures most efficient operation.

*T.M. of Harnischfeger Corporation for electro-magnetic type brake.

OVER 17,000
P&H CRANES
SERVE AMERICAN INDUSTRY...
FAR MORE THAN ANY OTHER

P&H
OVERHEAD CRANES
4411 W. National Avenue
Milwaukee 14, Wisconsin
HARNISCHFEGER
CORPORATION

POWER SHOVELS • CRAWLER AND TRUCK CRANES • OVERHEAD CRANES • HOISTS • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • DIESEL ENGINES • PRE-FAB HOM

BROACHES

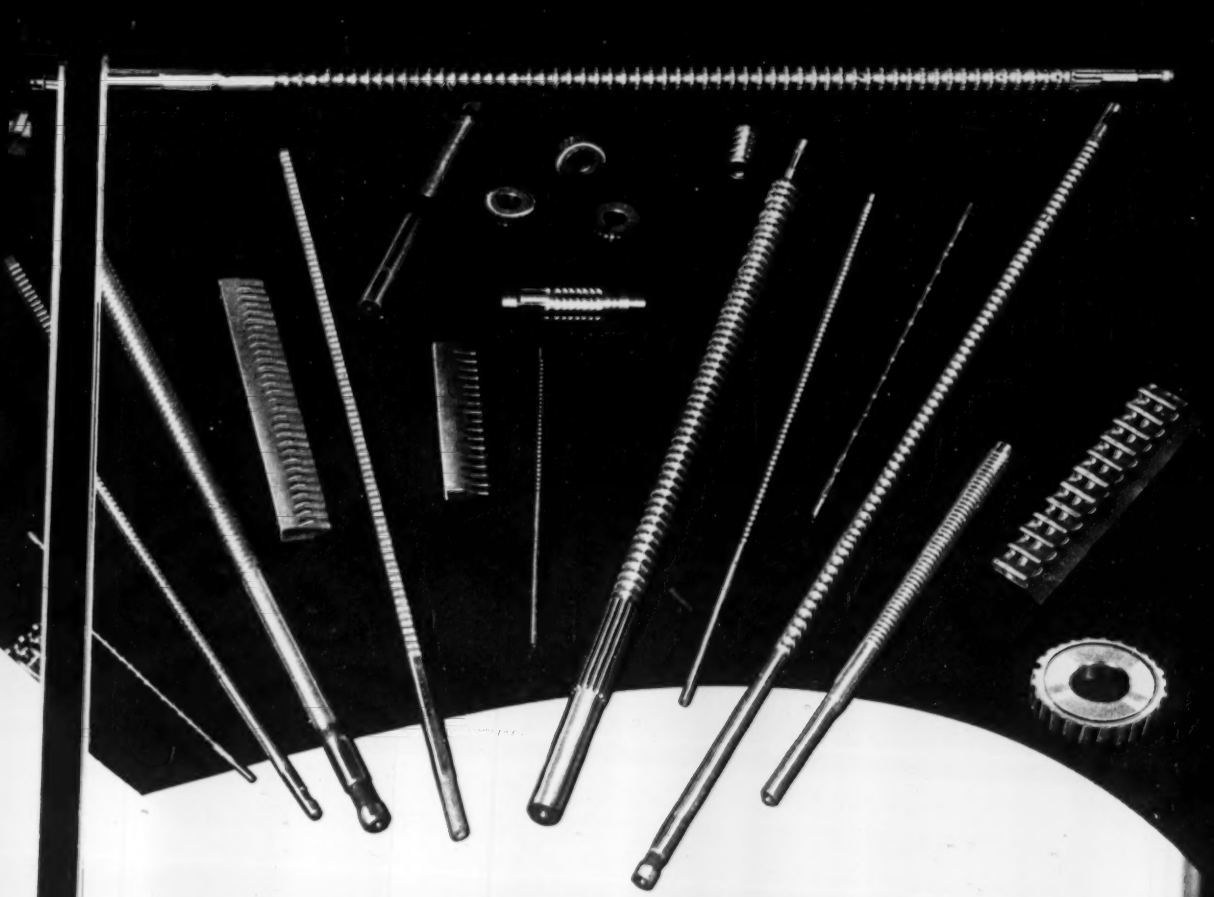
IN ALL SHAPES AND ALL SIZES

FOR SURFACE AND INTERNAL BROACHING

WE START WITH THE STEEL

. . . and we check its LAPOINTE-specified composition by disc inspection in our metallurgical laboratory. Assurance of *genuine quality control* is obtained in our heat treating department through the use of the Rayo-tube Temperature Control. For a double check, we treat pilot pieces of the same diameter as the tool, then we save a "coupon" of the tool itself!

AVOID DIVIDED RESPONSIBILITY! YOUR BROACHING MACHINES, TOOLS,



almost any production job will lend itself to BROACHING

. . . including cast iron, bronze, aluminum, stainless steel and most of the new alloys of titanium.

PRODUCTION SPEEDUP?

If you are interested in *stepping up your production capacity*, you probably realize that BROACHING is the *fastest possible method.*

REPETITIVE ACCURACY?

If you require many — or a few— parts *machined exactly alike* without costly methods involving rejects and re-working, remember that BROACHING gives you *repetitive accuracy to precision limits.*

LAPOINTE is the world's oldest and the world's largest manufacturer of broaching machines and broaches. Isn't it obvious that LAPOINTE has *more broaching experience* to offer, than any other manufacturer?

INQUIRIES WELCOMED on any problem involving broaching, or the possibility of broaching. Literature available by writing LAPOINTE, 3 Tower Street, Hudson, Mass.

THE *Lapointe* MACHINE TOOL COMPANY

HUDSON, MASSACHUSETTS • U. S. A.

Branch Factory: Watford, Herts., England

HUDSON LAPOINTE MASS.

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHES AND BROACHING MACHINES

AND FIXTURES CAN ALL BE ENGINEERED AND BUILT BY LAPOINTE

Let's talk turkey

about steel wire

● If you can't get all the steel wire you need, we may be able to help you do a satisfactory job.

Here's how: At one time or another, our skilled metallurgists have tackled just about every conceivable problem in steel wire fabrication. We often find manufacturers who specify a wire that is unsuitable for the job it has to do. In many of these cases we've been able to study the problem and come up with an answer that means improved fabricating techniques that lower production costs.

Sometimes we can suggest a slight *design* change that will save a lot more wire than you ever thought possible.

So take advantage of this free consultation service. It's nothing new. We've always offered it. But today, you may need it more than ever before.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

AMERICAN MANUFACTURERS WIRE

AMERFINE—*High-quality fine wire.*

AMERSPRING—*music steel spring wire.*

AMERLOY—*alloy heading wire.*

AMERTEMP—*heavy-duty oil-tempered wire.*

AMERHEAD—*uniform heading wire.*

AMERSTITCH—*extra-tough metal stitching wire.*

AMERICAN
MANUFACTURERS WIRE

USS TRADE MARK

UNITED STATES STEEL

"Most profitable turning investment we have ever made"

● This is the enthusiastic approval given the Warner & Swasey 1-AC Single Spindle Automatic by H. C. Stebbins, President of Cloyes Gear Works Inc. Timing gear specialists to the automotive industry for 30 years, his 50-man shop was faced with the necessity of expanding operations—without costly building construction—in the face of today's tight manpower situation.

The Warner & Swasey 1-AC answered this complex problem. Using the same floor space, production has been doubled on jobs previously done on hand-operated machines. And scarce machine operators have been released for other important jobs in the plant.

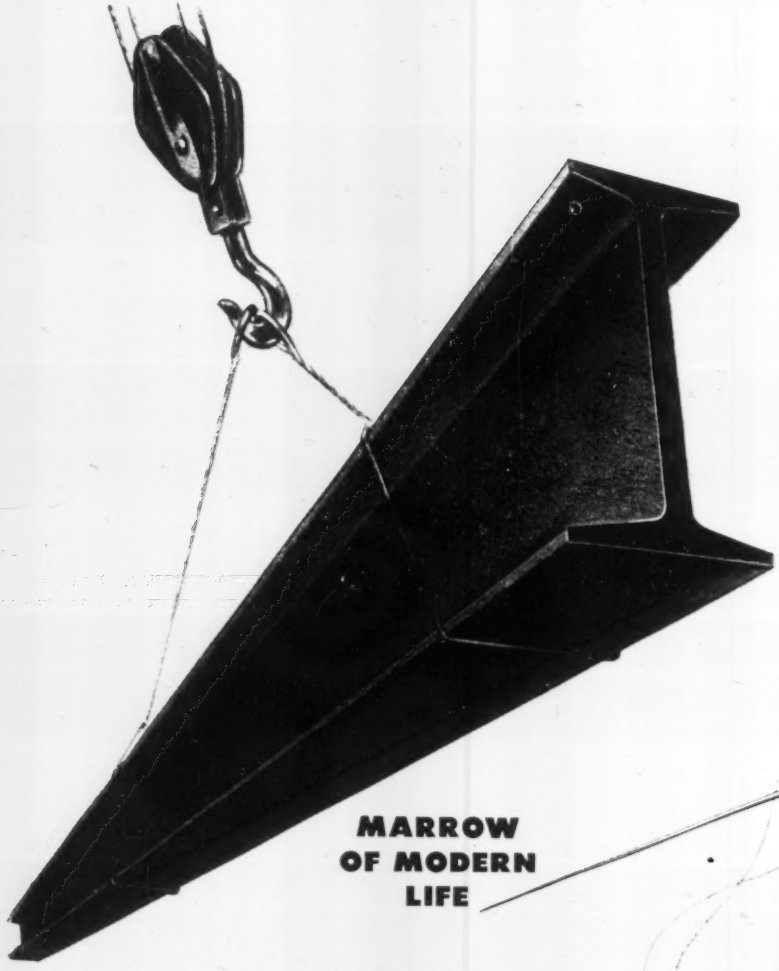
Charles Laslo, Plant Superintendent, reports that he finds the 1-AC adaptable to more and more jobs. And setup is quick—requiring no more time than was necessary for hand operated machines. In fact, it has been found profitable to set up for as few as 100 pieces—most unusual for an automatic machine. The 1-AC's over-all greater accuracy has improved the finished product, and limits of one-thousandth of an inch on bores have been maintained.

So before you make any additional investments in machine tools—or in additional building construction—first call in your nearest Warner & Swasey Field Engineer. He'll show you how Warner & Swasey Automatics can increase production in your existing floor space, and conserve your manpower.

Warner & Swasey 1-AC Single Spindle Automatic in use at Cloyes Gear Works Inc., Cleveland, Ohio.

WARNER & SWASEY
Cleveland

YOU CAN MACHINE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY TURRET LATHES, AUTOMATICS AND TAPPING MACHINES



MARROW OF MODERN LIFE

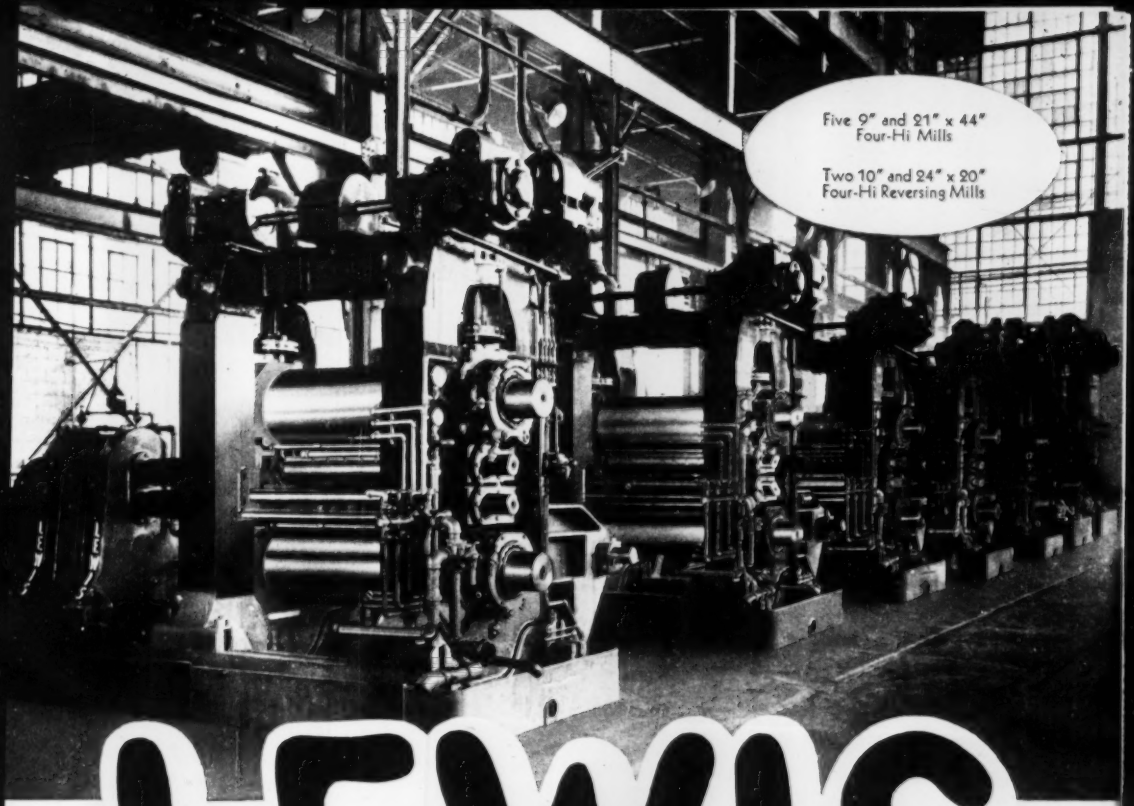
From the housewife's needle to the builder's I-beam, steel is part of every phase of modern life. The mills producing it are thundering at ever higher speeds, speeds made possible by close co-operation between designers and engineers in every industry which supplies components for the strip mills, blooming mills, rolling mills which are turning out ever-mounting tonnages. For many years, SKF has worked hand-in-hand with the steel industry, and has met and often anticipated its needs for the right bearing in the right place. 726S

SKF
BALL AND ROLLER BEARINGS

REASONS WHY SKF IS PREFERRED BY ALL INDUSTRY

integrity • craftsmanship • metallurgy
tolerance control • surface finish
product uniformity • engineering service
field service

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.— *manufacturers of* **SKF** *and* HESS-BRIGHT *bearings.*



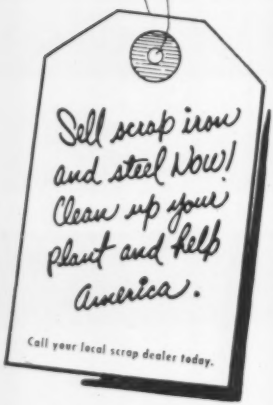
LEWIS

Rolling Mill Equipment ... meets rolling requirements

MANUFACTURERS OF
ROLLS AND ROLLING MILL EQUIPMENT
FOR THE IRON, STEEL AND
NON-FERROUS
INDUSTRIES

LEWIS FOUNDRY AND MACHINE DIVISION OF BLAW-KNOX COMPANY • PITTSBURGH, PA.

THE NEED IS URGENT! Annual steel production for military and civilian needs is topping the 100-million-ton mark . . . yet the iron and steel scrap needed to maintain this vital production is *not* available at the steel mills! That's why, for the good of the nation, the steel industry is calling on *you* for help.



Get the Scrap in now!

Clean out the scrap at your plant or factory. Old machines, gears, girders, rails . . . discarded tanks and boilers . . . whatever you can find in the factory or its yards. *Sell* that scrap now, at today's good price. Your local scrap dealer will start this vitally needed scrap on its way to the steel mills.

Remember: The scrap iron and steel you sell today helps produce the steel you need tomorrow. Dig it out now.

WEIRTON STEEL COMPANY
WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION

Waterbury-Farrel Announces

A NEW STEP FORWARD... IN AUTOMATIC NUT FORMING..

To step-up your nut-producing facilities, look to Waterbury-Farrel's new line of automatic nut formers.

Check these production-boosting design features.

HIGH SPEED—without sacrificing quality. Nut blanks need no subsequent operation except threading.

SIMPLIFIED TOOLING—larger tool holders.

EASY-TO-GET-AT ADJUSTMENTS—save "down" time.

NEW CUT-OFF DEVICE—of ingenious design.

SIMPLIFIED TRANSFER MECHANISM — with locking device for position.

HYDRAULIC CONTROL — for feed and brake action.

SAFETY-INTERLOCKED LUBRICANT PUMPS—for machine and tools. Machine cannot be operated until lubricant is turned on.

BLANK INVERTER—for work that must be turned over during sequence of operations.

Write, wire or phone for further information.

CENTENNIAL

We're always pioneering . . . we started 100 years ago on March 5, 1851. When we stop pioneering, we stop (period). In this ad you'll find evidence that we're going ahead, into our second century.

In Equipment, Experience Counts . . . We're 100 in '51!

WATERBURY FARREL FOUNDRY & MACHINE COMPANY

WATERBURY, CONNECTICUT, U. S. A.

Sales Offices: Chicago, Cleveland and Newark

A FEW OF THE MANY TYPES OF METAL WORKING MACHINERY MADE BY WATERBURY FARREL

COLD PROCESS BOLT AND NUT MACHINERY—Headers (all types) • Re-headers • Trimmers • Thread Rolling Machines • Slotters • Nut Tappers, etc. *POWER PRESSES*—Crank, Cam and Toggle; also Rack and Pinion Presses • Multiple Plunger Presses • Hydraulic Presses, etc. *MILL MACHINERY*—Rolling Mills • Wire Flattening Mills, Chain Draw Benches • Slitters and various accessory mill machinery. *WIRE MILL EQUIPMENT*—Continuous Fine Wire Drawing Machines (Upright Cone and Tandem) • Bull Blocks • String-up Machines • Spoolers, etc.

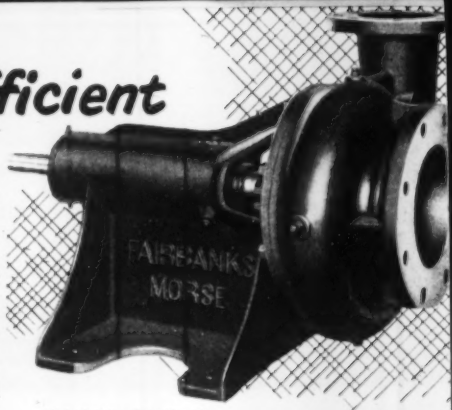
FOUNDED WATERBURY FARREL 1851

WF 2

LITTLE...But Mighty Efficient

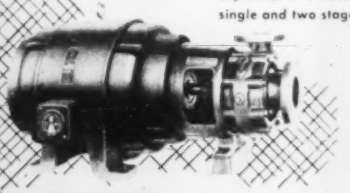
If your pump requirements call for a small to moderate size pump, you'll find the efficient, economical answer in the Fairbanks-Morse line.

Take Figure 5530 Side-Suction Centrifugal Pumps, for example. These compact, sturdy pumps are highly efficient, yet they're economical both in first and operating costs. Because Fairbanks-Morse is able to apply production line methods, with precision machining of all parts, you get the same high standards of material, workmanship and performance normally found only in highest quality split-case centrifugals.



Side-Suction Centrifugals . . . capacities 25 to 3000 g.p.m.

Builtogether Centrifugals . . . capacities 5 to 1200 g.p.m., single and two stage.



Or take Fairbanks-Morse Builtogether Centrifugals . . . the exceptionally compact units that combine motor and pump in one efficient unit. These space-savers can be installed in virtually any position.

Or take any of the small size Fairbanks-Morse pumps. Rotary, Westco Turbine Type, or small straight centrifugals. You get the same "big pump" quality and efficiency that pay off in more years of economical, efficient service.

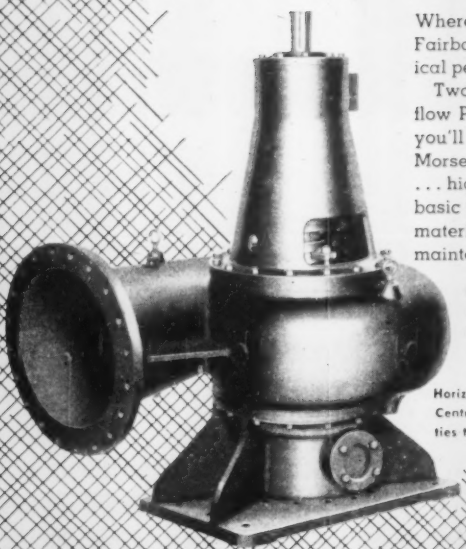
FAIRBANKS

A NAME WORTH

BIG..But Low in Operating Costs

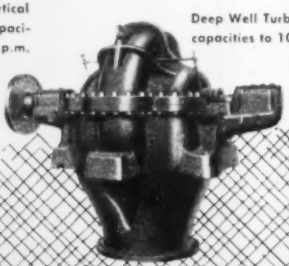
Where pumping requirements demand big capacity pumps, again Fairbanks-Morse can answer your needs for more efficient, economical performance.

Two-Stage, Split-Case Centrifugals, Horizontal and Vertical Angle-flow Pump, Deepwell Turbine Pumps, Vertical Propeller Pumps . . . you'll find the pump that exactly fits your needs in the Fairbanks-Morse line. Whatever the characteristics of the particular service . . . high or low head . . . capacity . . . efficiency . . . wet or dry pit . . . basic water supply, booster service . . . transfer service . . . or liquids material handling . . . you'll get the service you want at minimum maintenance and operating costs.

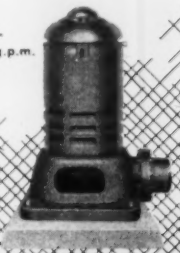


Horizontal and Vertical Angle-flow . . . capacities to 100,000 g.p.m.

Horizontally Split-Case Centrifugal . . . capacities to 50,000 g.p.m.



Deep Well Turbine . . . capacities to 10,000 g.p.m.



Take the WAIT Out of Weighing Whether It's a Beam Scale..

You can weigh fast *and accurately* with a beam scale . . . if it's Fairbanks-Morse. These efficient weighing instruments were designed for easy-reading and accurate weighing.

All poises on Fairbanks-Morse Beam Scales are center indicating, full open face. Large, easily readable figures on face plates are set at a 45 degree angle to assure fast, easy reading . . . regardless of the height of the weigh-man! These Fairbanks-Morse advantages mean less chance for costly human errors . . . less "waiting on weights" . . . faster operation.

Fairbanks-Morse Beams can be furnished as standard, full capacity, or as Type-Registering with weights are printed on a card for accurate records. Beam counting scales are also available to count accurately *by weight*, small parts or pieces. Counting scales save time, money and are an essential aid in accurate inventory control.

Full Capacity Beam Scale

Beam Counting Scale

Type Registering Beam Scale

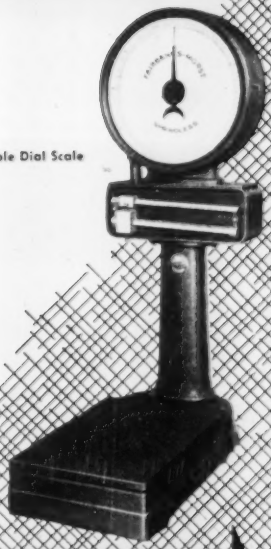
-MORSE

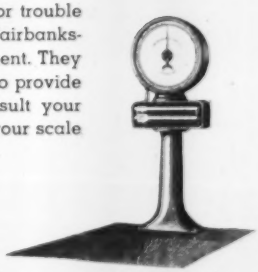
REMEMBERING

...OR A Dial Scale

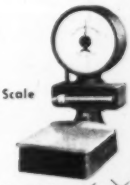
Fast, enduringly accurate Fairbanks-Morse Dial Scales speed and simplify industrial weighing wherever they are used. Basic simple design, with an absolute minimum of moving parts, assures less chance for trouble . . . less chance for inaccuracies. There is a Fairbanks-Morse Dial Scale to fit any weighing requirement. They can be equipped with Printomatic Recorders to provide an accurate printed record of weights. Consult your Fairbanks-Morse weighing expert regarding your scale needs.

Portable Dial Scale





Platform Dial Scale



Bench Dial Scale

See next page for Fairbanks-Morse Sales Centers

FOR PROTECTION

AGAINST DUST, DIRT, ABRASIVES, STEAM, FUMES, ETC.

New Fairbanks-Morse Type QZE, Frame 284 Motor. Also available in smaller frame sizes.

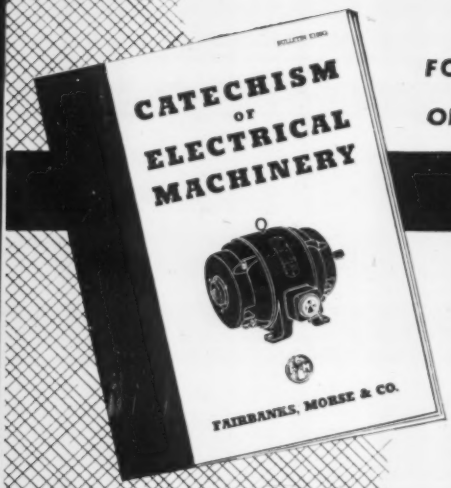
FAIRBANKS-MORSE

Totally Enclosed, Non-Ventilated Motors

For the toughest operating conditions, here is the newest development in totally enclosed, non-ventilated motors. Fairbanks-Morse Type QZE Motors are now available in Frame 284—delivering 7½ hp. at 1800 r.p.m., 5 hp. at 1200 r.p.m—filling a long-standing need for this type and size of motor. New features that assure cool, long-running service include a unique end-bell construction with cooling fins for efficient heat dissipation—and for safe, uniform, internal temperatures. For the full story on the new dependability this class of QZE Motors can bring to your most severe motor jobs, ask your Fairbanks-Morse motor representative or write Fairbanks, Morse & Co., 600 South Michigan Ave., Chicago 5, Illinois.

FAIRBANKS

A NAME WORTH



FOR INFORMATION

ON DESIGN AND USE OF ELECTRIC MOTORS

Send for This Manual!

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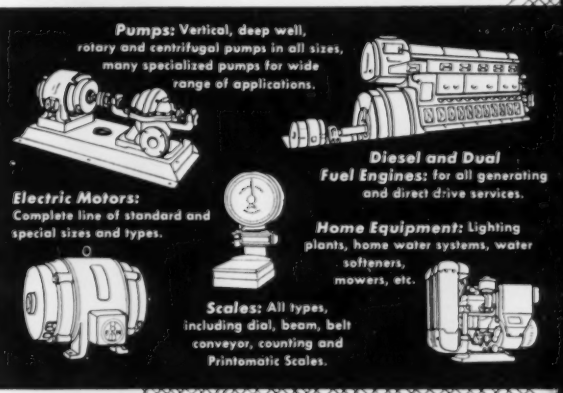
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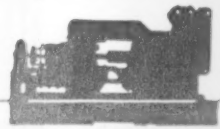
So don't waste time in expensive experimentation . . . avail yourself of this ready-made experience that comes as a plus value to every Acme-Gridley owner. Our engineers will be glad to get you started on the road to greater munitions production, *greater profit*. They'll also be able to give you the latest information on how to take advantage of our constantly improving methods to get top performance from your present Acme-Gridleys. May we help you?



ACME-GRIDLEY BAR and CHUCKING AUTOMATICS built in 1, 4, 6 and 8 spindle styles, maintain accuracy at the highest spindle speeds and fastest feeds modern cutting tools can withstand.

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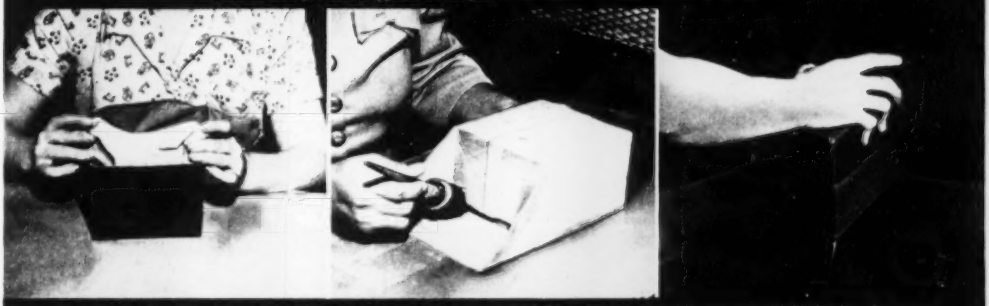
Method IA for protecting a precision part: first the part is completely immersed in rust preventive; after the rust preventive has set, the part is enclosed in a pre-cut wrapper; then the part is lap-dipped in a special sealing compound.



Method IA for protecting a carton: first the part is placed in the carton; next the carton is enclosed in pre-cut and folded strips of wrapper and sealed at all seams; then the package is lap-dipped in sealing compound and the carton is safe for shipment.

Dearborn . . . headquarters for packaging to

government specifications

If you are packaging machines and equipment to government specifications, Dearborn can help you.

Illustrated above are graphic demonstrations of the widely known Method IA . . . typical uses of the government specified packaging materials that are available from Dearborn. Broadly, these government specified materials include rust preventives, wrappers, sealers, case liners and fingerprint neutralizers. Other Dearborn materials include cleaners, rust removers and VPI, the specially treated paper that gives off an invisible protective vapor.

Why not discuss this important matter with a Dearborn packaging engineer? He will gladly assist you in setting up a packaging procedure that fully meets government specifications . . . one that will assure the corrosion-free arrival of your products at their destination.

This booklet will help you

The new edition of "Preventing Corrosion in Export Packaging" gives you: (1) current government specifications; (2) cleaning methods; (3) approved packaging methods; (4) how to apply rust preventives; (5) how to wrap, seal and dip parts; and (6) other valuable information with step-by-step picture stories. Write for it today.

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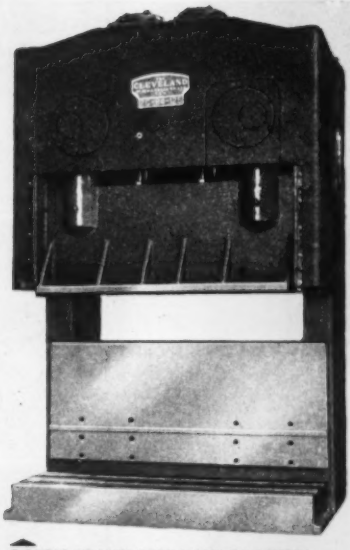
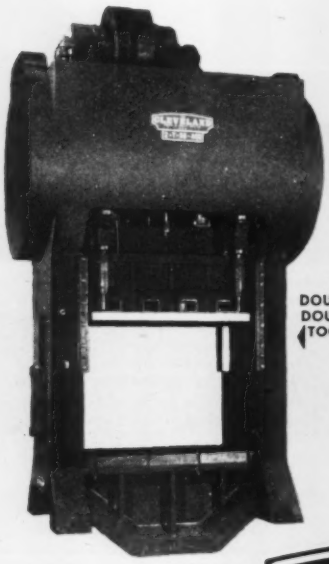
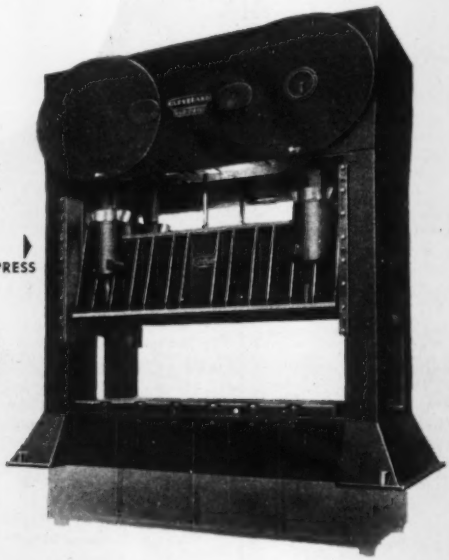


DOUBLE CRANK OPEN BACK GAP PRESS



DOUBLE CRANK, DOUBLE ACTION TOGGLE PRESS



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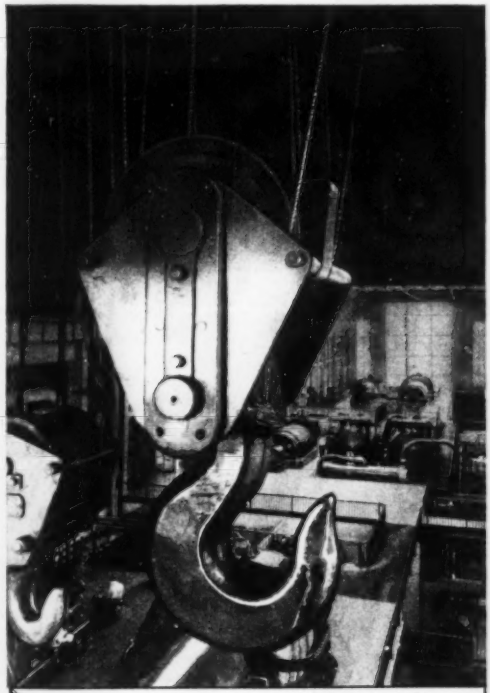

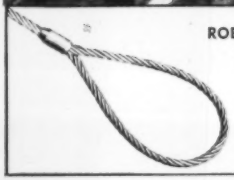

ROEBLING ALL-PURPOSE SLINGS with the Tapered Sleeve Splice come to you ready for the job. They cost less than tucked splices . . . have the full strength of the rope. Send for the full story.

You'll get more efficient, economical service with ROEBLING rope

TIME AND DOLLAR SAVINGS are more important than ever in industrial operations. One sure way to save time and cut costs is to specify Roebling Preformed "Blue Center" Steel Wire Rope. Here's a tough rope that stands up under shocks, acceleration stresses, excessive abrasion and bending. Its preforming assures maximum handling ease, better spooling and smooth performance.

Roebling makes a complete line of wire rope. Have your Roebling Field Man recommend the *right* ropes for your requirements. And for longest life on the job, get his advice on the correct use and maintenance of wire rope. John A. Roebling's Sons Company, Trenton 2, New Jersey.

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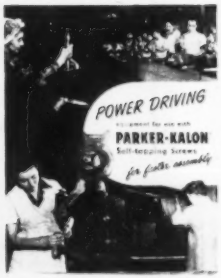
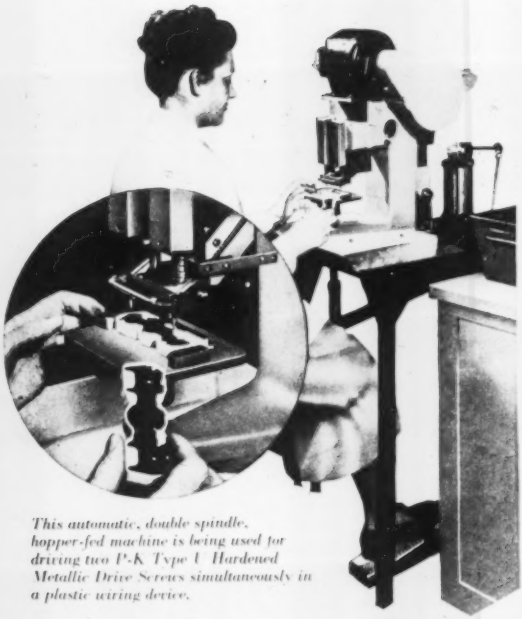
NEW P-K Bulletin tells how to add more speed to the faster fastening method



Describes and illustrates the various basic types of electric, air-operated and impact tools, as well as the automatic hopper-fed machines for screw driving in common use. Helps you determine which type is best for your assemblies. Also includes useful information on proper bit and socket selection. Free on request.

POWER DRIVING

of P-K Self-tapping Screws



This automatic, double spindle, hopper-fed machine is being used for driving two P-K Type U Hardened Metallic Drive Screws simultaneously in a plastic wiring device.

To meet America's colossal production requirements . . . for defense, for civilian goods . . . even more speed is needed in operations that have already set time-saving records.

Fitting right into this urgent need for *more speed, more efficiency*—in assembly operations—is the ever-wider use of Power Driving devices with P-K Screws.

A wide range of Power Driving equipment is available for use with the various types of P-K fasteners—and with slotted, Phillips recessed, and hex head styles. And all types have this in common—a substantial reduction in assembly time and cost.

Parker-Kalon does not manufacture power-driving equipment, but has tested many devices in the P-K laboratory under production line conditions, and found them suitable for use with P-K Screws. The information contained in the "Power Driving" Bulletin is based on reports of these many tests.

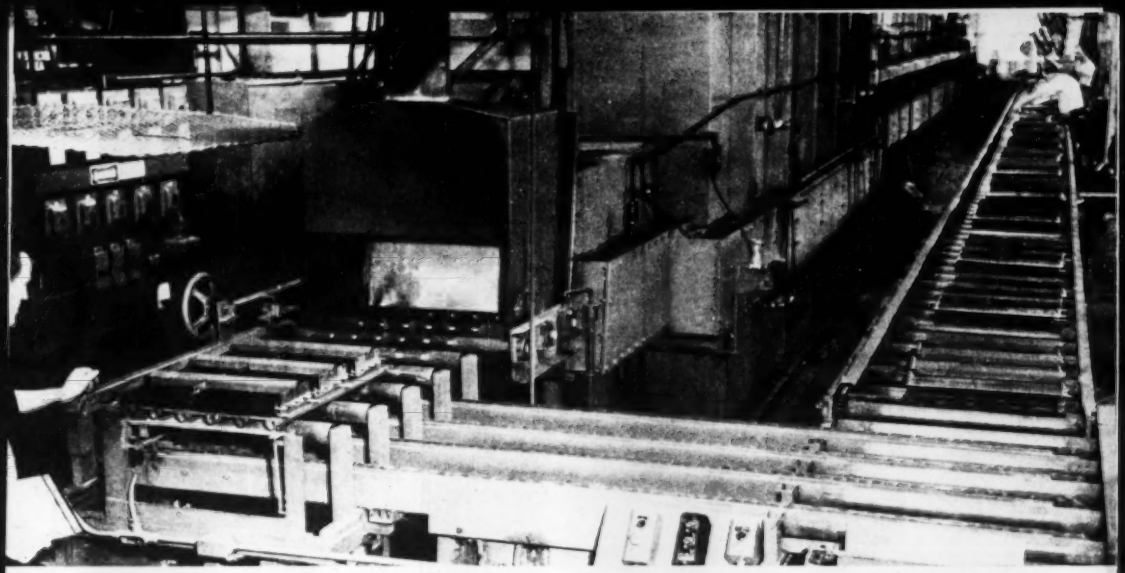
For specific information on power driving applied to your assemblies, talk to a P-K Assembly Engineer. Your P-K Distributor will furnish a copy of the Power Driving Bulletin . . . ask for Form No. 401. Or write: Parker-Kalon Corporation, 200 Varick St., New York 14.

IF IT'S P-K IT'S O.K.

The Original

PARKER-KALON® SELF-TAPPING SCREWS

A TYPE AND SIZE FOR EVERY METAL AND PLASTIC ASSEMBLY

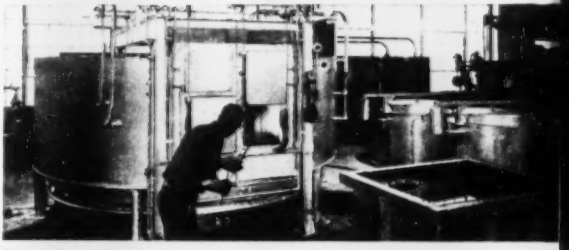


Roller-hearth furnace for high-production continuous brazing of bomb-casing assemblies, annealing shell casings and hardening and drawing jet engine parts.

Get High Speed Heat-treating for Your Defense Production

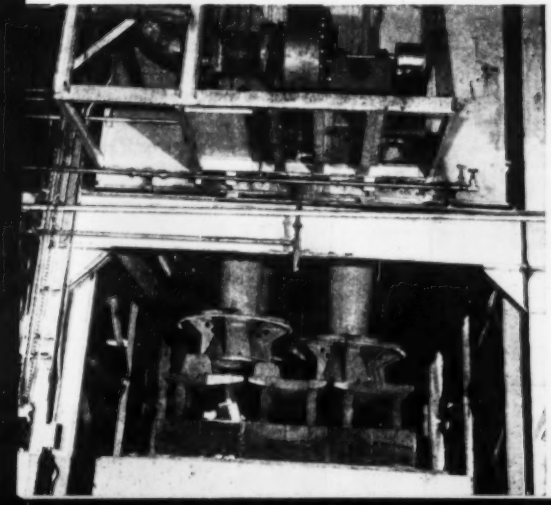
Defense equipment manufacturers are achieving fast production, low over-all cost and high quality products with dependable G-E electric furnaces. And you can benefit in the same way . . . draw on G.E.'s *tested designs* and broad experience from building furnaces since World War I . . . know that your new furnace is dependable during this vital work . . . and will serve you just as ably when you again produce civilian goods.

Present your heat-treating application to the nearby G-E Sales Office, or write to: Sect. 720-50, General Electric Co., Schenectady 5, N. Y.



Rotary-hearth furnace for heating parts which require individual handling such as hardening gears and projectiles and forging jet engine blades.

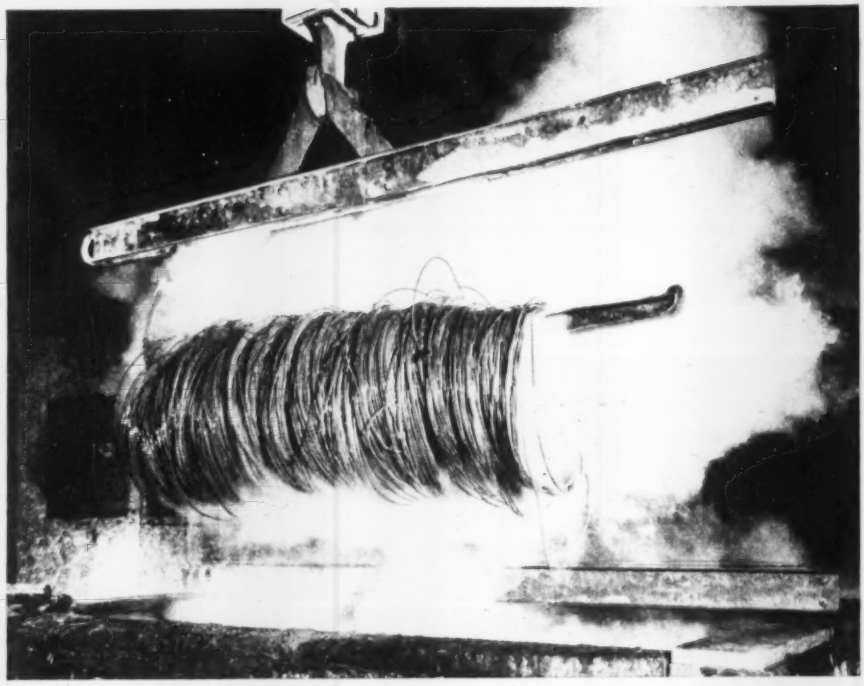
Elevator furnaces for annealing stainless steel assemblies, aluminum and magnesium parts and malleable iron castings.



Mesh-belt-conveyor furnace for accurate, automatic furnace-brazing, bright-annealing and sintering of small parts.

GENERAL ELECTRIC

720-50



Monel pickling hook used at the Pittsburgh Steel Co., Pittsburgh, Pa. Fabricated by Youngstown Welding and Engineering Co., Youngstown, Ohio.

Reconditioned after 7 years in use!

Monel pickling hooks after "minor surgery" and welding are ready for more years of service

Back in 1944, Pittsburgh Steel Co. installed Monel hairpin pickling hooks.

Monel® was selected after many tests with other materials that failed in less than a year.

Operating conditions were tough, pickling in 10% sulfuric acid at 130°, carrying a load of 3,000 pounds.

But Pittsburgh Steel felt that Monel could take it.

And they were right!

After *seven* years in use, the hooks showed signs of weakening only at the acid line.

And the fabricators, Youngstown Welding & Engineering Co., remedied that!

They cut out the corroded section and welded in new Monel.

Now, Youngstown feels that the hooks are almost as good as new and will give many more years of service.

This is a typical example of how fabricated Monel pickling equipment can give long service life—then be reconditioned with a small amount of material to give additionally long service.

Tough, corrosion-resistant Monel equipment can help you increase the efficiency of your own pickling room, too. Monel crates, racks, chains, hooks, and accessories are used by many of the nation's leading plants to give increased payloads and longer service life.

Right now, Monel is hard to get because so much is being diverted to defense production. But if you have a special metal failure problem, Inco's Technical Service Section will be glad to help you solve it. Write, giving full details.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N.Y.

INCO TRADE MARK **MONEL**...for minimum maintenance

STEEL

The Metalworking Outlook

October 22, 1951

Softening-up Process in Steel

More wildcat steel strikes are coming. They're all part of the process to try to soften up the steel company managements before the big wage negotiations that will probably begin about Dec. 1. Some 2300 Youngstown Sheet & Tube Co. employees were idle last week because of slowdowns at the Brier Hill, O., plant; 18,000 weren't working at Inland Steel Co., tie plate output at U. S. Steel Co.'s Gary, Ind., works has dropped because of slowdowns.

UE Wins—and Loses

The left-wing United Electrical Workers' claims relating to its jurisdictional victory at Schenectady, N. Y., leave the impression that it is gaining over the CIO's IUE in the number of General Electric Co. workers it represents. The UE has actually lost ground slightly to the IUE which represents some 70,000 GE people, more than half the organized workers. The UE won the elections at Schenectady by a wider margin than it did in the prior contest, but it has controlled the big Schenectady unit ever since the IUE-UE split. The UE lost ground at GE's Pitney Glass Works in Cleveland where some 350 employees went over to the IUE.

Doubled Deliveries in a Year?

Deliveries of military goods will be made at the rate of $10 billion or $11 billion a quarter one year from now. Deliveries in the third quarter reached more than $5 billion. Department of Defense regards as the most serious bottlenecks hampering the achievement of the $10 billion goal the shortage of specialized new machine tools and engineers, designers and machinists.

Worse Before Better

The machine tool shortage is going to get worse before it gets better. That's because the potential increase in new mobilization orders will be greater than the increase in machine tool shipments in the months ahead. A climax in the scarcity will probably be reached sometime in late 1952 or early 1953, after which production will be high enough to work off the backlog of orders, and the worst of the problem should be over.

Troubles in Wages

Tool and die executives are protesting to the Wage Stabilization Board that area rates proposed by a special panel appointed by WSB would have serious inflationary and unstabilizing effects throughout all industry. The report, with public and labor members generally agreed, recommended area ceilings which would permit unusually large wage increases. Industry members dissented from the majority findings. The committee was charged with the task of coming up

Production-Engineering News—p. 69 *The Market Outlook—p. 127*

with wage arrangements for the tool and die shops that would help the industry keep its skilled labor.

"Widespread Misuse"

Watch for a crackdown on the way the emergency procedure for expediting the delivery of production equipment is being handled. The Munitions Board, which administers the setup, notes "widespread misuse" of the arrangements. It prescribes a succession of "normal" measures which must hereafter be exhausted by the contracting officers for the Armed Services. A real emergency must first be demonstrated and needs stripped to the minimum before the board will forward to NPA the necessary form NPAF-76—"Request To Advance Delivery of Production Equipment." First applicable to tools only, the procedure has now been extended to all production equipment.

Small Business Makes Out

Small business is doing far better in a garrison economy than some alarmists would have you believe. A study of a sample of metalworking firms with fewer than 100 workers shows employment rose 24 per cent in the year after Korea. In companies with more than 500 employees, the work force was also up, but only by 14 per cent. The failure rate among small firms was lower in the first half of 1951 than in the corresponding period of 1950.

Steel for Sale

Cutbacks in consumer goods production are so heavy that some suppliers to those manufacturers are finding themselves with excess steel inventories—particularly of flat cold-rolled. A little of that tonnage is being resold, usually through warehouses.

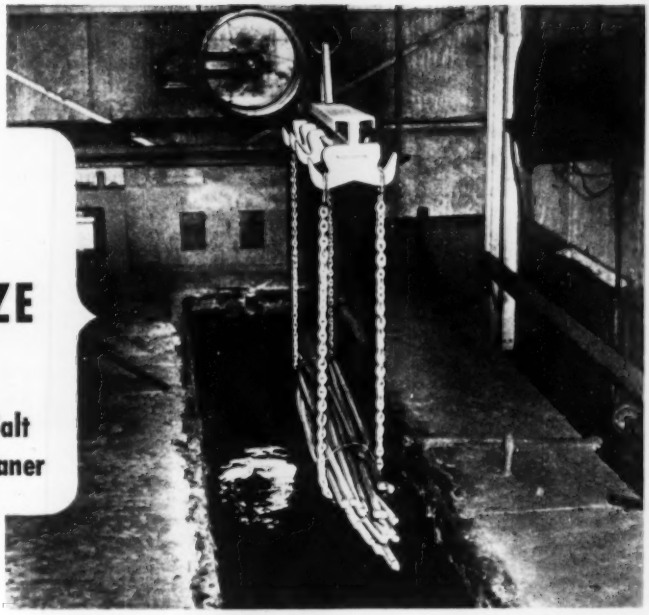
Straws in the Wind

E. F. Houghton & Co., Philadelphia, has developed a rubber-impregnated leather packing designed for aircraft parts and thousands of other items actuated hydraulically and pneumatically . . . More than 25,000 companies will be asked to start making quarterly financial reports to the government to aid OPS; information will be collected by the FTC and SEC . . . A total of some 55,000 tons of copper have now been released from the stockpile to aid defense output . . . Demand for primary pig lead is more than three times the supply.

What Industry Is Doing

Need engineers? Help yourself (p. 41) . . . First quarter allotments in steel, copper and aluminum are up for defense use, sharply down for civilian goods (p. 44) . . . Sales of belt conveyors will hit an all-time high this year (p. 44) . . . More steel was produced in the U.S. during September, the third quarter and the first nine months of 1951 than ever before in corresponding periods (p. 45) . . . Britain may have troubles in Iran and Egypt, but the economies in the three most important Commonwealth nations are booming (p. 51) . . . A briqueting machine developed in the South compresses cans into small bundles for blast furnace use (p. 52).

SMALL LOAD of bars ready for Virgo bath. Bars will then be quenched, dipped in dilute acid, and hosed clean. Total processing time: 11 minutes.



DESCALE, DESAND, DEGRAPHITIZE IN 11 MINUTES

with VIRGO® Descaling Salt VIRGO® Molten Cleaner

The Hooker Process for descaling stainless and alloy steels and for cleaning ferrous metal of any type is the quickest, simplest available.

Use this Process on all forms of steel; castings; forgings; fabricated parts; material to be salvaged. It gives you a chemically clean, bright metal surface—with full dimensional stability—in minutes.

The Process is non-electrolytic . . . non-toxic . . . uses simple equipment . . . does not require close control . . . is easily adapted to your production methods. For full details, mail the coupon or write us today.

VIRGO DESCALING SALT—quickly, positively removes hard-to-touch scales produced on stainless and alloy steels by hot rolling, forging, extruding, casting, annealing.

VIRGO MOLTEN CLEANER—quickly, positively desands and degraphitizes castings; removes grease, dirt, chemicals, paint, rubber, enamel, atmospheric corrosion and other impurities from all alkali resistant metals.

WE HELP YOU with 15 years' experience in molten salt bath descaling and cleaning. Complete engineering, research, sales, and on-site operating assistance are part of our service.

SEND FOR THESE BULLETINS . . . get the whole story on Virgo Descaling Salt and Virgo Molten Cleaner—what they are, how they work, their advantages, how they fit your operations, and the Hooker services you enjoy as a user of the process. Send for these bulletins today.

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Here's How—Turn In Your Dormant Scrap At Once

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We Do More with Less

Last week in Detroit tens of thousands of persons who work in various capacities in the metalworking industries had an opportunity to witness exhibits and demonstrations and to hear the presentation and discussion of technical papers which reflect in realistic fashion the current status of technology in this highly important field. It is safe to assume that because of the widely diversified interests of those who attended the National Metal Congress and Exposition and the current World Metallurgical Congress, no two individuals came away with the same impressions in regard to the significance of what they saw and heard. That which seemed tremendously important to one expert was of secondary or even little importance to others.

Nevertheless, by analyzing the impressions of many scores of visitors to the meetings and exhibits, it becomes obvious that their varied appraisals of the event all conform to a rather definite pattern. There is common agreement that it was the most successful of the many annual shows and conventions sponsored by the American Society for Metals. There is also agreement that the exhibits and meetings reflected more faithfully than in many previous years the character of industry's current problems that are peculiar to the present emergency.

One striking indication of this timeliness of what one saw and heard at Detroit was the prevalence of excellent examples of how fabricators and end users of metals are utilizing them more effectively. Part of this strong trend toward improved utilization is due to normal progress in technology and part—perhaps a substantial part—is due to the present pressure to conserve scarce metals.

It would be difficult to overestimate the economic importance of this factor of effective utilization. Imagine, if one can, how many tons of ferrous and nonferrous metals would be required to meet the nation's current needs if industry were compelled to use today the materials and methods that were used a decade ago. If it were possible to compare this tonnage with actual current consumption, the savings resulting from more effective utilization would be phenomenal.

We do more with less and do it better.

E. C. Shaner

EDITOR-IN-CHIEF

UTILIZING ENGINEERS: Competent authorities estimate that there is a shortage of from 30,000 to 100,000 graduate engineers. Engineering Manpower Commission of the Engineers Joint Council places the the present unfilled demand at 60,000. Five reasons are cited: 1. Fewer births in the thirties and the resulting present decline in number of college graduates. 2. End of G. I. Bill training. 3. Last year's estimate by Bureau of Labor Statistics that there

would be more engineers than jobs for them. 4. Attempts of our economy to produce a peacetime plenty while it carries on a fractional war. 5. Ineffective utilization of engineers by industry.

Correcting No. 5 is a job for the metalworking industries. A careful check in many companies would reveal that in too many cases men with engineering training are engaged in routine drafting, compiling statistics or doing other work which does not require a background of engineering education or experience. An intelligent reshuffling of personnel might release competent talent for engineering projects.

Another pertinent consideration is remuneration. Have engineers' salaries kept pace with those of other comparable professions? —p. 41

* * *

BRIQUETS TIN CANS: Southern Tin Compress Corp., an affiliate of F. Perlman & Co., Memphis, Tenn., scrap dealer, is operating an automatic baling press which compresses tin cans into 5 x 5 x 12-inch briquets at the rate of 2 to 2¼ tons per hour. Several southern blast furnaces have been charging loose tin can scrap to reduce the otherwise high phosphorus content of pig iron. A Pittsburgh furnace has contracted for 500 tons of briqueted cans for early delivery.

Southerners believe the potential market for briqueted tin cans may be as much as a million tons a year. Steel Briquette Corp., Atlanta, developer and builder of the baling press, has applied for certificates of necessity to build 12 more machines. The Memphis scrap firm has three presses on order for delivery shortly after the first of the year. Briqueting of tin cans may easily put to good use millions of tons of refuse which heretofore has been consigned to city dumps. —p. 52

* * *

ANCHORS FOR BRITAIN: Britain's difficulties in Iran, Egypt and some other points placed renewed emphasis upon her opportunities in Canada, South Africa and Australia.

W. C. Stolk, president of American Can Co., spoke enthusiastically of Canada's future at ceremonies opening his company's new container plant at Chatham, Ont. "I see no ceiling on Canada's future," he said. He foresees a time when the dominion, which now supports a population of 13.5 million, will have 75 million people living within its borders.

Favorable trends are reported in South Africa. Since the end of World War II more than $1500 million of foreign capital has been invested in the Union of South Africa. Of this amount, about $100 million represents funds from the United States for plants making autos, tires, office equipment, home appliances, etc. Foreign interests likewise are investing more heavily in facilities in Australia. —p. 51

* * *

TACKS GO FOR DEFENSE: About 15 manufacturers in the United States make tacks. Cut tacks, which are in far greater demand than wire tacks, in 1951 will consume about 25,000 tons of slit hot-rolled steel sheets and 2000 tons of nonferrous metals. Sales will total $18 million.

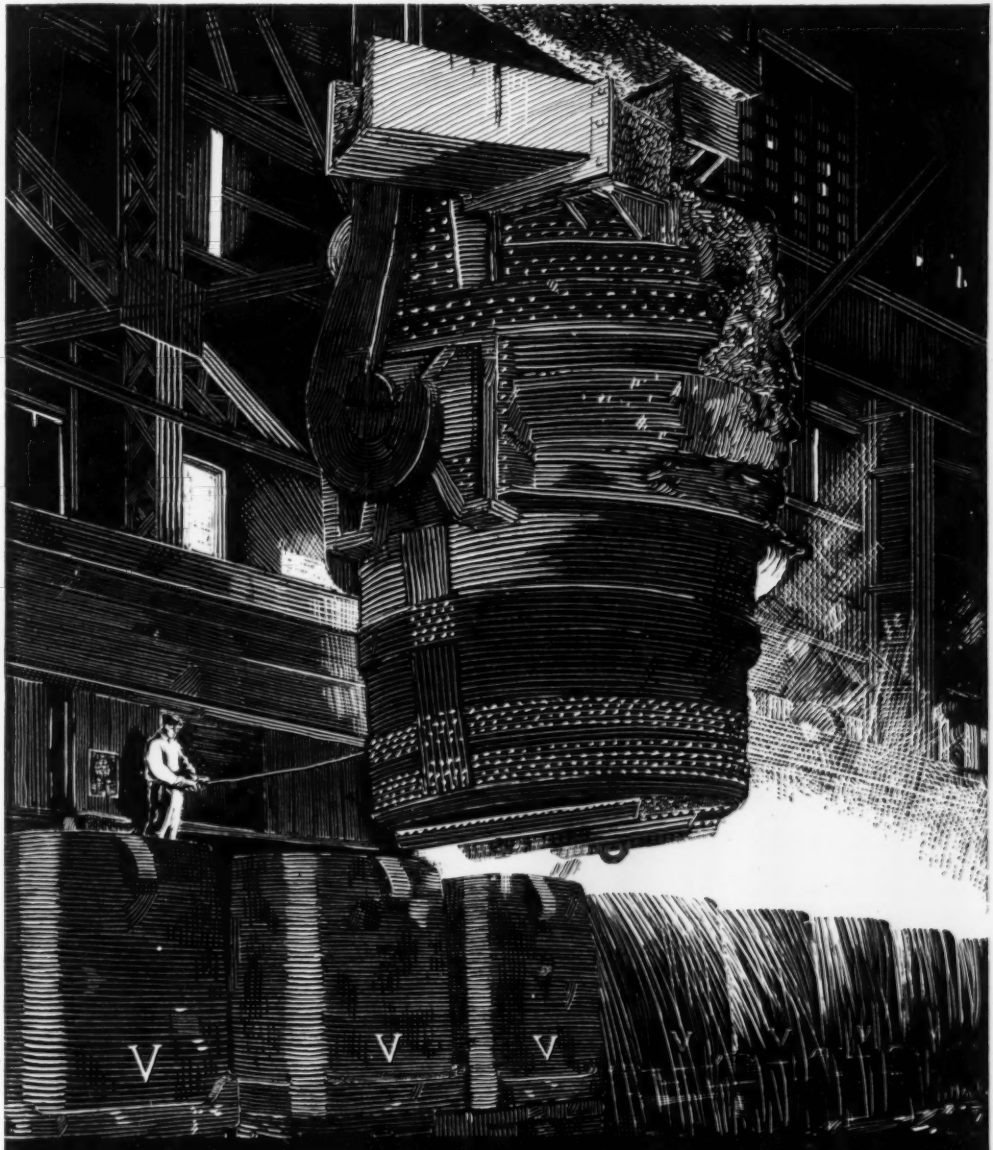
Two of the largest consumers of tacks are shoe and furniture manufacturers and today both are operating at low rates of capacity. It is estimated that 15 per cent of tack output is going to defense work, chiefly in the form of nails for shoes for the armed services. Shoe nails, while designed as nails, belong to the tack family.

To date the industry has been able to obtain enough steel to meet demand but it complains about difficulty in procuring enough nonferrous metal, particularly copper and copper-base alloys. The entire tack industry is concentrated in the New England states and around Baltimore. —p. 53

* * *

TITANIUM'S CHALLENGE: High strength, light weight, high endurance limit and resistance to corrosion and heat are the outstanding properties of titanium which make it so attractive to the aircraft industry. Unfortunately to date, companies which have done extensive work with titanium have encountered difficulties in machining it. They have found it is more difficult to machine than stainless steel. It machines more like the less familiar high-temperature jet-engine alloys.

This means that all users of titanium must meet the need of developing more effective machining methods. Numerous companies, including cutting tool manufacturers, machine tool builders and engine and aircraft manufacturers, already are pooling information gained from their experience. Most of this information still is preliminary to the extent that no one is yet satisfied that the best procedure for turning, drilling, milling or tapping titanium has been found. Here is an important challenge. —p. 74



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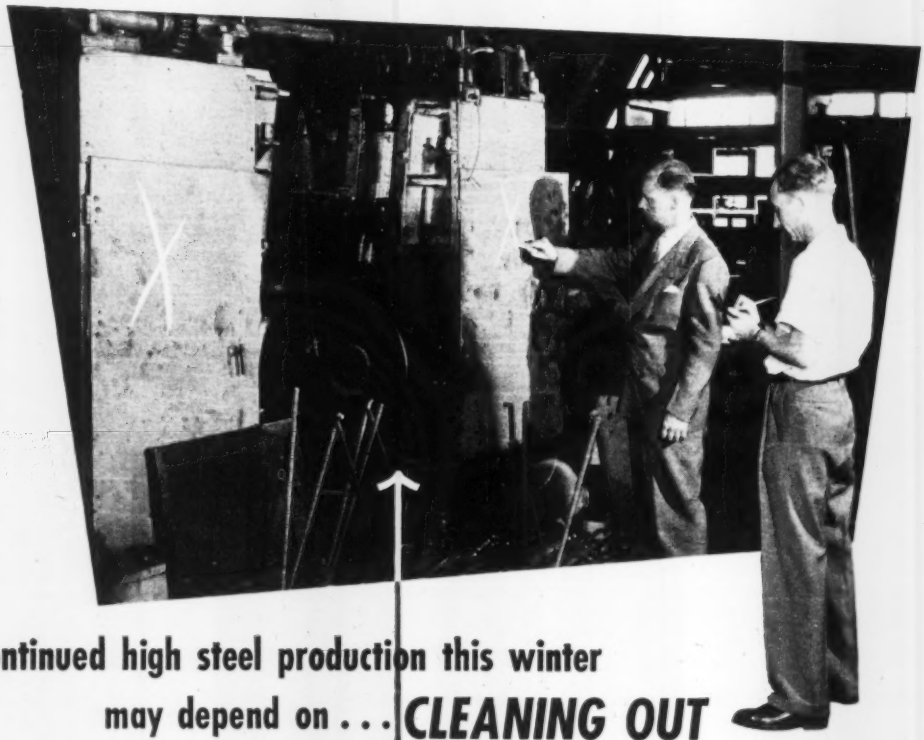

Continued high steel production this winter may depend on . . . CLEANING OUT → YOUR SCRAP THIS MONTH

HOW TO TURN SCRAP INTO MONEY with an organized dormant scrap round-up in your plant:

1. Appoint a top executive with authority to make decisions to head the salvage drive.
2. Organize a Salvage Committee and include a member from every department.
3. Survey and resurvey your plant for untapped sources of dormant scrap. Encourage your employees to look for miscellaneous scrap and report it to the committee.
4. Sell your entire organization on the need to scrap unusable material and equipment.
5. Prepare a complete inventory of idle material and equipment. Tag everything not in use.
6. Start it back to the steel mills by selling it to your regular scrap dealer.
7. **KEEP AT IT!**

***DORMANT SCRAP** is any obsolete, broken or worn-out and irreparable machinery, tools, equipment, dies, jigs or fixtures, etc., that may encumber your premises.

Despite . . . and because of . . . the continued high rate of steel production, the steel industry is on a hand-to-mouth basis in its receipts of purchased scrap . . . *essential to production!* Mills that normally inventory a 60 day supply of scrap, are now maintaining high production with less than a week's supply on hand. *That the effect of winter on transport facilities could quickly exhaust these dangerously meager scrap inventories . . . and thus force a cut in steel production* . . . is obvious. Help assure an uninterrupted steel supply by rounding up and selling your dormant scrap* to your regular scrap dealer *this month!*

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Need Engineers? Help Yourself

An increase in the efficiency or productivity of only 10 per cent among engineers would be equivalent to adding 40,000 to the labor force. The need is for 60,000

By EDWARD C. BIRKNER, Associate Editor

THE MANLESS tables on the cover are symbolic of the shortage of engineers, estimated at 60,000 right now. Typically the need for engineers is greatest during a production build-up. Since the build-up is now, the need is now. The most effective way industry can alleviate its shortage is by utilizing more efficiently the engineers it does have.

DON'T SWALLOW without chewing. That was the caution urged by Selective Service Director Lewis B. Hershey in some homespun advice he gave to draft boards on interpreting the great bulk of information sent to them on critical occupations and essential activities. The recommendation might apply equally well to industry faced with a critical shortage of engineers.

There is no dearth of information on the shortage. Estimates put it between 30,000 and 100,000. The Engineering Manpower Commission of the Engineers Joint Council estimates a present unfilled demand for 60,000 engineers. Since the turn of the century the number of engineers per thousand workers has doubled and redoubled (see the chart). An economy based on a continuing improvement in the standard of living presages a continued growth in the engineering ranks, or at least a continuing need for them.

Breakdown—Why is there and will there be a shortage? Five reasons given are: Fewer births in the 1930s and a resulting decline in the school population; the end of the G. I. Bill training; publicity given to last year's estimate by the Bureau of Labor Statistics that there would be more engineers than jobs for them; an economy that is trying to produce a peacetime plenty while it carries on a fractional war; ineffective utilization of engineers by industry.

Industry can do little about any of the causes except the last one. And it will have to. The need for engineers is typically greatest during a production build-up. The build-up is now. The need is now. Logically then, industry must concentrate its efforts where they will do the most good. The most immediate steps it can take are those that will make for better utilization of engineers.

A predicted need for 30,000 engineers every year, industry is told, will not be reached until 1965. If we are to be the arsenal of the free world, says Carey H. Brown, chairman of the Engineering Manpower Commission, "we must outdesign and outproduce our enemies." We can't wait until 1965 to do that—or even until 1955. Industry can build for the future supply of engineers certainly, but its more immediate need is for engineers for production in the present build-up.

From Where They Sit—Many engineers and a good many more ex-engineers reading about the shortage snort: No such thing! Past insecurity, springing from unemployment or paycuts in slack times (like the middle 1930s), may be responsible for their attitude. Perhaps, too few engineers are paid enough to stay in the profession. Some critics blame it on "short-sighted management and poor personnel policies."

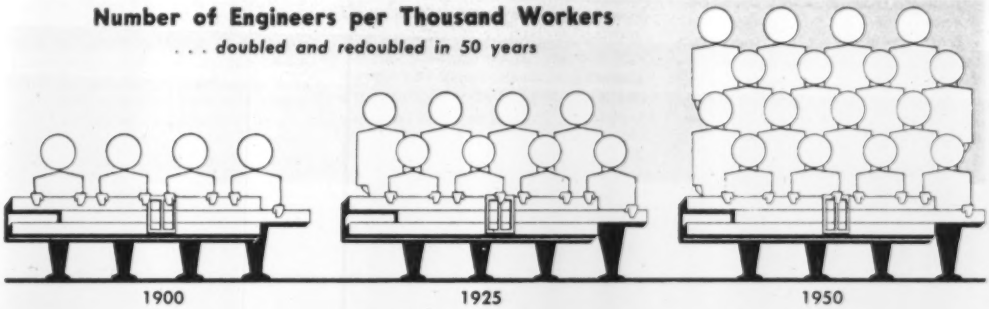
One engineer, Don C. Mitchell, speaking before the American Society of Engineering Education, asks, "How many engineers are hunched up over a drafting board on mechanical work. How many are compiling statistics and drawing graphs? How many are playing nursemaid to ailing machines? How many are making routine tests? How many are caught in the blind alleys doing specialized work that requires no particular talent? In other words, do we have a shortage of engineers or does it just look that way because of the manner in which we have put engineers to work? Would we have a shortage if we replaced them with people trained to do some of the routine jobs on which engineers are now being used?"

Meter Readers?—Ralph P. Sollott, director of Manpower Utilization in the Defense Department asks: "What are industry's hiring practices? Are engineers still stockpiled for the first two or three years from the honor graduates of the big engineering schools to wash test tubes or read meters? Or are they being used as engineers?"

Randolph W. Chaffee of Kenneth A. McIntyre Associates, Cleveland, writing in the June issue of *Machine Design* underscores the point: "When a bricklayer commands a protected income of $6000 a year, the potential engineering apprentice asks himself whether he should invest many thousands of dollars and years of his time in preparing for a lowly engineering

Number of Engineers per Thousand Workers

. . . doubled and redoubled in 50 years



job paying half that much—provided the variables in the work allow him to keep working 12 months every year."

The positive case that the Engineering Manpower Commission makes for industry in the engineering shortage is admittedly to emphasize the necessity for a proper balance between the requirements of the armed forces and essential industry in the next few crucial years when engineers are most needed.

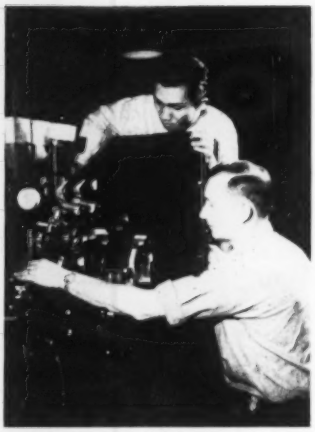
Balance of Power—Is there a proper balance? Government agencies, including federal, state and local, account for 14 per cent of the electrical engineers, 10 per cent of the mechanical engineers and 6 per cent of the chemical engineers out of a total employment of 400,000—or about 40,000 of the engineers who are in critical supply.

"It is worthwhile noting," says Henry H. Armsby, associate chief of engineering education in the Federal Security Agency, "that an increase in the efficiency or productivity of only 10 per cent among engineers . . . would be equivalent to adding to our labor force about 40,000 engineers."

With only some of the foregoing in mind industry can ask itself if its engineers are conducting research, if they *do* plan and supervise tests to determine life wear and strength of materials and parts, if they *are* organizing personnel and equipment to produce new or improved equipment to get required output safely and with minimum cost. Those are some of the things that a professional engineer does, according to the Dictionary of Occupational Titles. And he takes part in such activities only when they require the applications of a knowledge of the engineering, physical and mathematical sciences equivalent to that acquired in a four-year engineering curriculum.

Rule of Thumb—Are your engineers doing tasks like those? The measure of your own engineering shortage can be scaled according to how far you look into engineer utilization. The measure of the worth you get out of your engineers will hinge upon how much you do about correcting deficiencies.

What are some of the ways that you can get better engineer utilization? Here are some: Hold young engineers in apprentice positions only long enough to qualify them for full-fledged engineering jobs. Release engineers from jobs that require little or no engineering talent and put the jobs in the hands of others with less training and talent. Give engineers properly trained assistants to relieve the burden on them, thus allowing them to take on more strictly engineering tasks.



NO TARIFF BARRIERS: Exports of American engineering know-how are pouring freely into 21 foreign countries. Young engineers carry it back to their home lands after attending the year-long Westinghouse Foreign Student Training Program. The course gives the student a comprehensive view of virtually all company operations and intensive study in the manufacturing division. Here for example, a foreign student gets firsthand knowledge of network protectors

The British are training assistants and apprentices by releasing qualified people from work one or two days per week to attend school. To achieve better utilization, American industry can also break down operations in much the same way as is done in the job dilution programs at vocational levels. Utilization of the training facilities of engineering schools for the conduct of college-level training courses will also help get engineer assistants.

Voracious—Industry will still need and want more engineers. Some suggestions on how to get them without pirating: Relax hiring restrictions because of age. One government agency says age restrictions in many places are such that engineers over 55 are not being utilized to an appreciable extent.

If you are in the locale of an engineering school you may find it profitable to hire engineering students part-time. Federal Security Agency's Office of Education suggests utilizing college juniors and seniors, even some engineering instructors part-time.

Industry can give refresher courses to former engineers and scientists to get them back into the profession they have left.

Industry can also utilize consulting engineering firms. Frequently a short-term need for an engineer can be more economically handled by that method instead of attempting to hire an engineer or (even more difficult) trying to set up an engineering staff.

The Long Term—What of the future? Will industry be faced with makeshift arrangements in engineering for the next decade. Probably so—unless it joins in the growing campaign to prepare for the future. What can it do? It can encourage qualified young men to get into engineering by offering scholarships to employees' youngsters, by holding competitive examinations and or contests. Westinghouse annually hunts for the best potential scientists among the nation's high school seniors, this year is conducting its eleventh annual Science Talent Search.

Industry can offer reward to needy students. The Lincoln Arc Welding Foundation this year gave $5000 in cash awards to 63 engineering students in 34 different colleges.

Too, industry can support engineering colleges and universities by direct appropriations to assist in improving facilities and personnel for educating new engineers and furthering research activities. Case Institute of Technology is one actively soliciting aid from industry in the vicinity of Cleveland through its alumni group by asking plants to become "investors" in the college facilities and graduates.

Money—Industry can encourage—financially—extension, night and part-time courses in engineering. It can do as many companies have done or are doing: Develop on-the-job and co-operative training programs with institutions of higher learning to help employed persons get scientific and technical training.

Industry will not have to go it alone, either. One organization that is doing much is the Engineers Joint Council, whose lead can profitably be followed in the long-term by industry. It has started a program of encouraging more qualified high school students to enter engineering and is working on the reduction of attrition in the engineering schools through better high school and college counseling.

A. C. Monteith of Westinghouse, speaking before the Engineering Manpower Convocation in Pittsburgh last month said: "It would be the height of folly to rob industries of their trained technical men, or to draft all those young men for the armed services. . ."

It would be even greater folly if industry robbed itself of its own technical manpower by not utilizing it properly.

Metals: How To Get More from Less

Free world's metallurgists study most effective utilization of available materials to provide goods for peace and armament at National Metal Congress and Exposition

HOW to make optimum use of available metals to provide goods for defense and at the same time maintain a high standard of living. This was the No. 1 problem explored by the free world's metallurgists at Detroit last week.

Conservation and substitution measures to relieve the world-wide scarcity of metals and means to increase the production of such materials attracted wide interest at the first World Metallurgical Congress, held in conjunction with the thirty-third National Metal Congress and Exposition.

Free World Was There—Participating in the sessions were more than 400 representatives from 36 foreign countries. An equal number of top American metalworking men contributed to the sessions. The congress provided an opportunity for metallurgists from all over the world to pool their experiences and talents, cross fertilize their ideas and bring forth suggestions for strengthening the position of the free nations.

The foreign delegates, who for the past several weeks toured American metalworking plants, are enthusiastic over the congress. They hope to come back another year.

The Show—The exposition, staged at the Michigan State Fairgrounds, set a new high in number of exhibitors and visitors. Four hundred companies displayed equipment valued at between $9 million and $10 million in seven buildings. The show at Chicago last year had 362 exhibitors.

More than 40,000 visitors trod through the exhibition halls to establish a new record in attendance. The Chicago and Cleveland shows of past two years had 35,000 each.

Many Refinements — While the show offered little in the way of innovation, it presented many refinements and improvements in machines and instruments for fabricating, processing, analyzing and testing ferrous and nonferrous metals.

Labor Hits Sour Note—Exhibitors had one loud complaint about the show. That was the difficulty in getting exhibits set up due to jurisdictional disputes among six or seven rival unions supplying labor in the exhibition halls. Goon squads armed with stillson wrenches roved the corridors to make sure that carpenters did no work coming under the jurisdiction of the riggers, that no one other than an electrician plugged in a lighting fixture, that decorators rolled out the carpets, etc. Exhibitors were thoroughly bewildered and the labor leaders almost equally so.

CARBIDE WELDING RODS

. . . give wear-resistant skin to metal

New Metals—Made by Man

Chrome carbides give high wear resistance. Require neither tungsten nor cobalt

CHROME CARBIDES, man-made metals with high resistance to abrasion, erosion and corrosion and lighter in weight than tungsten carbides, made their bow at the National Metal Show at Detroit.

The new carbides, produced from powdered metals, contain approximately 70 per cent chrome. They eliminate costly and strategic tungsten and cobalt.

While the new materials may find some applications where tungsten carbides now are used, they are expected to supplement rather than supplant the tungsten carbides.

General Electric Co.'s Carboloy Department, Detroit, developed the chrome carbides, which have been dubbed series 600. The metal is now out of the laboratory stage, has been field tested and is being readied for commercial production. A new plant will be built at Edmore, Mich., to supplement production at the company's Detroit plant.

Applications—Chrome carbides are being used in pilot quantities for gage blocks, ring gages, plug gages and gage anvils, where its ability to resist abrasion and corrosion is important. The new material has about the same coefficient of expansion as steels and gaging results are not affected by air temperature variations.

The new metal also is expected to find applications in the petroleum industry, especially in valves, in centrifuge blades, and in the chemical, dairy and food processing, aviation and marine fields because of its resistance to corrosion, abrasion, erosion and high-temperature oxidation, in all of which it excels tungster carbides. The material is nonmagnetic.

Initially, chrome carbides will be priced the same as tungsten carbides. The new metal is only half as heavy as the tungsten carbides.

Weldable Tungsten Carbide—Metal parts may be coated with a thin layer of ultra hard tungsten carbide through a weldable tungsten carbide, now in the engineering appraisal stage. It can be flowed onto metal surfaces, using conventional shielded electric arc welding equipment (see photo).

Thermistors—Carboloy also lifted the curtain on "thermistors," produced from metal oxides, which have the unusual electrical property of sharply decreasing resistance to current flow as temperature increases. Thermistors enable instruments to read temperature variations of as little as 1/1000th of a degree.

Plant To Recover Cobalt Metal

A plant to recover cobalt metal from ore concentrates at the Fredericktown, Mo., properties of National Lead Co. is to be placed under construction immediately. The plant is to be ready for production in 14 to 18 months and will process 50 tons of concentrates a day.

National Lead now has a total of 10 million pounds of cobalt-nickel concentrates in storage at Fredericktown, besides 7 million pounds of government-owned roasted concentrates, all available for immediate processing. The company's present mining and milling operations in that area are producing ore concentrates sufficient to sustain continuous operation of the new treatment plant.

Development of a new process made the plant commercially feasible in recovery of highly essential cobalt, now in extremely short supply. Also recovered from these concentrates are quantities of nickel and copper.

First Quarter Allotments

They're up in steel, copper and aluminum for defense use, sharply down for civilian goods

THE AX will fall on first quarter, 1952, civilian production because the direct military take for steel in that period is 408,000 tons more than in the fourth quarter, 1951, 81 million pounds more for copper and 80 million pounds more for aluminum.

Materials will be allotted for 930,000 automobiles in the first quarter, although the industry may be able to produce 1,006,000 by conserving metals and absorbing inventory. For household appliances, 11.6 per cent less steel will be permitted, 29 per cent less copper and 16 per cent less aluminum.

The Big Three—The estimated supply of 21,125,000 product-tons of steel for the first period is dependent upon sufficient supplies of scrap. The alloy steel supply figure for the first quarter is lower than the fourth quarter because of shortages in nickel and other alloying materials. Supplies of aluminum may be limited by the power scarcity in the Pacific Northwest. D. P. A. Administrator Manly Fleischmann terms copper estimates "generally optimistic."

"The allotments for ship construction are well below that requested," says Mr. Fleischmann, "although quite near the fourth quarter level. The limiting factor is the acute shortage of plates and structural steel shapes." Petroleum industry allocations are designed to keep the refining program at a high level, but some of the proposed construction of gas transmission lines will have to be deferred. The administrator says farm machinery allotments are "sufficient."

More Generous — Structural steel authorized for industrial expansion in the first quarter is about 50,000 tons more than was provided in the fourth quarter. That's made possible by increasing output and further cutbacks on civilian construction. But aluminum for structural purposes will be very tight. "There's no question," says Mr. Fleischmann, "that many producers of building items who use aluminum will be forced to very low levels in the first quarter."

Enough materials have been allocated for railroad equipment next January, February and March for construction of 18,000 freight cars, 2000 tank cars and 1500 cars for industrial and export use. In the industrial equipment area, allotments for machine tools have been sharply increased, but allocations for items like textile machinery won't permit substantial increases over base-period.

For Attrition—Actual CMP tickets authorized for 23,214,000 tons of steel in the next quarter add to about 112 per cent of the total estimated supply. That apparent over-allotment is to take care of attrition. All CMP allotments authorized in any quarter are not used. DPA has allotted 1,367,000 pounds of copper products to claimant agencies, or about 110 per cent of the estimated supply. Aluminum allotments reach 713,566,000 pounds, 110 per cent of the supply.

The table below shows the individual allotments of the three CMP materials. Fourth quarter, 1951, allotments appeared in STEEL, Aug. 6, p. 43.

Upgrade for Conveyors

Belt units, particularly, are in great demand, notably for defense uses

SIX GEORGIA convicts rode to temporary freedom last month via a belt conveyor normally used to carry stone from a prison quarry to trucks on higher ground.

This was a new use that even conveyor engineers hadn't thought of. They've dreamed up many legitimate applications, because sales of belt conveyors used for bulk handling will this year hit an alltime high of some $67 million, 25 per cent higher than in 1950.

The Big One—Belt conveyors prob-

Where Allocated First Quarter Materials Will Go

CLAIMANT AGENCY AND PROGRAM	STEEL (TONS)	COPPER & COPPER ALLOYS (000 lbs)	ALUMINUM (000 lbs.)
Dept. of Agriculture	43,350	2,440	100
Dept. of Army	35,200	1,525	100
Atomic Energy Comm.	141,050	8,515	6,000
Civil Aero. Admin.	17,077	735	100
Defense, Dept. of	2,408,700	297,000	250,000
Defense, Elect. Pw.	309,550	79,050	39,000
Defense Fisheries Ad.	1,682	31	5
Defense Minerals Ad.	36,927	1,605	200
Defense Solid Fuels (Coke Ovens)	17,258	400	70
Defense Solid Fuels (Coal Mines)	9,096	213	15
Defense Trans. Admin.	63,253	1,759	200
Federal Civil Def.	2,238	65	—
Federal Security Org.			
Hospitals	64,123	2,583	400
Education	96,296	3,897	10
General Services	24,014	640	100
Housing & Home Fin.	83,700	5,978	250
Dept. of Interior	12,280	175	64
Maritime Admin.	100,975	4,840	100
OIT—ECA	652,500	10,435	2,000
Petroleum Ad. for Def.	1,708,500	8,300	850
Public Roads	201,520	900	250
Veterans Admin.	12,395	1,337	80
NATIONAL PRODUCTION AUTHORITY DIVISIONS			
Agr. Mach. & Impl.	527,100	7,800	6,500
Aircraft	12,400	1,708	6,000
Aluminum & Magnesium	12,850		100
Building Materials	1,113,100	51,850	45,300
Canadian	415,050	4,600	2,150
Chemicals	314	1,384	5,090

CLAIMANT AGENCY AND PROGRAM	STEEL (TONS)	COPPER & COPPER ALLOYS (000 lbs)	ALUMINUM (000 lbs.)
Communications	39,550	47,230	2,500
Constr. Machinery	487,654	7,220	2,400
Consumer Durable Goods	870,260	38,220	49,000
Containers & Packaging	1,682,250	258	19,000
Copper	43,250	3,300	2,260
Electrical Equip.	586,710	147,169	24,250
Electronics	75,385	33,760	18,000
Engine and Turbine	580,500	29,930	3,900
Facilities Bureau	712,700	28,886	7,000
Gen. Components	1,089,500	172,074	18,000
Gen. Indust. Equip.	500,436	41,905	17,000
Iron and Steel	243,216	17	—
Leather & Lea. Prod.	11,740	1,668	1,200
Lumber & Wood Prod.	6,840	175	1,000
Metalwkg. Mach. & Equip.	556,000	36,028	7,000
Mining Mach. & Equip.	114,661	3,283	250
Misc. Metal & Min.	2,518	1,159	35
Motion Pict.-Prod.	7,999	1,206	3,200
Motor Vehicle	3,054,131	128,055	77,710
Ordn. & Shipbuilding	95,870	7,276	1,250
Printing & Publishing	10,659	1,105	500
Pulp & Paper & Paperbd.	1,170	22	25
Railroad Equip.	1,640,750	86,360	6,000
Rubber	30,533	4,023	950
Scientific & Tech. Equip.	45,490	40,380	13,000
Service Equipment	46,397	2,863	3,700
Textile	No Requirements		
Tin, Lead & Zinc	—	3	—
Water Resources	158,152	3,633	175
Reserves			
MRO-Self-Certification, Field Cases & Small Users	2,334,426	105,159	43,833

ably account for more of the sales volume than any other single item among 86 different kinds of conveyors, reports R. C. Sollenberger, executive secretary of Conveyor Equipment Manufacturers Association. Broadly classified, the industry's production consists of bulk handling and package handling conveyors. Belt conveyors are used for both bulk and package handling, but most of the belt units are for bulk jobs. About 40 companies make belt conveyors; some 150 to 160 firms making all kinds of conveyors are in the industry. Sales of all types of conveyors will equal or surpass the 1948 record this year (which will be more than five times the average dollar volume in 1935-1938), but the business in bulk units, including belt, will be 5 or 6 per cent above 1948.

Bulk belt conveyors are used most commonly in power plants, mines, on construction jobs and in chemical facilities. Estimates are that about 60 per cent of all conveyor business is for direct defense. The rest is largely defense-supporting. The direct-defense ratio for belt units is probably even higher. The best defense buyers of belt units are also the principal civilian users.

Structural Steel—The belt conveyor makers are seriously hampered by government limitations on structural steel. They're doing fairly well on all other steel product allotments, and belting and component supplies have been reasonably adequate. But because of structural scarcities, some companies can't even fill rated orders in this quarter. Rumor has it that plates will be nearly as bad in the next three months. Average order backlogs in belt conveyors is about ten months; there's little chance that the backlog can be pared down.

More than 90 per cent of all belt conveyors are engineered for the job. Some components are standardized, but most units must fit particular circumstances. That means the industry must rely heavily on the conveyor engineer who is becoming scarcer and scarcer. It takes two to five years after a man gets an engineering degree to make him a conveyor engineer.

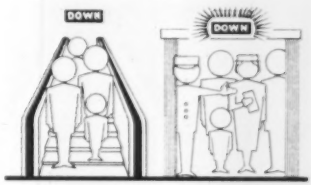
Two Officials Die

W. B. Ogden, 59, vice president, Valley Mould & Iron Corp., Hubbard, O., died in Chicago Oct. 17. He had been with Valley Mould since 1924. Prior association was with Brier Hill Steel Co., Republic Steel Corp. and Arthur G. McKee & Co.

W. H. Foster, 85, chairman of the board, General Fireproofing Co., Youngstown, died Oct. 18.

Up and Down Business

Sales of elevators and escalators are currently dropping because of U. S. building curbs



GOING DOWN. That's what sales in the elevator and escalator business are doing because of government restrictions on building.

Elevator sales may drop 20 per cent this year from the $148 million level reached in 1950. That's because 70 per cent of the elevator business is for passenger units, and construction of office buildings, apartments and hotels in which they go is now curbed. The situation in escalators is even more serious. The $11 million volume in 1950 may slide to $5.5 million this year.

Worst To Come—The worst is yet to come, for 1952 should witness substantially heavier cutbacks. This year, most construction requiring passenger elevators and escalators was well underway before government cutbacks became too severe. But next year, the ax will really fall. So, elevator and escalator companies are looking for defense contracts, but war work thus far is not great. It includes the manufacture of range finders, transmissions and drive sprockets for tanks; machine tools; crankcases and cylinder liners for aircraft; and winches and steering engines for the Navy.

About 55 companies do 90 per cent of the elevator business; four producers make most of the electric stairways. The 55 major firms in the elevator business manufacture and assemble most of the parts and install the units. In addition there are about 50 other companies in the country which service such equipment and in other ways account for the remaining 10 per cent of the elevator volume. Last year's total elevator business of $148 million included servicing as well as manufacture of new units and compared with the alltime peak of $151 million in 1949 and $46 million in 1939. Besides the 70 per cent of the elevator business that normally goes into passenger equipment, 16 per cent is freight and 14 per cent miscellaneous.

Self-Contained — Subcontracting is not widespread among major elevator manufacturers. Virtually all buy their cable, motors and certain other electrical equipment outside, but they do not let much of their machining, casting or general fabricating.

Despite the gloomy outlook, some uplifting signs exist for elevator and escalator manufacturers. An increasing number of escalators are being installed for industrial use, and more freight elevators are needed to maintain the steel industry's blast furnaces and oil refiners' cracking units.

Three Production Records Set by Steel Industry

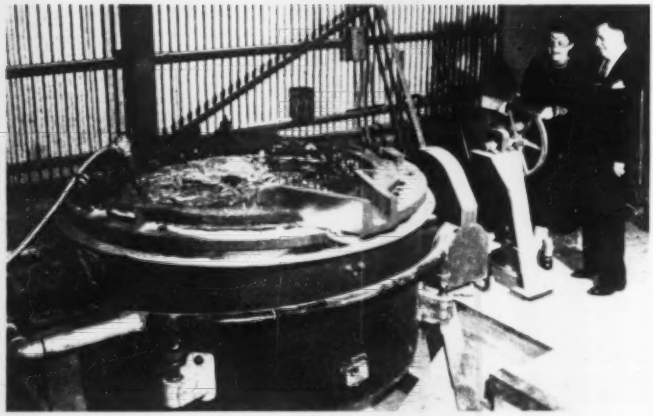
MORE STEEL was produced in the United States during September, the third quarter and the first nine months of 1951 than ever before in corresponding periods.

The September output of steel for ingots and castings is preliminarily totaled at 8,644,000 net tons, the American Iron & Steel Institute reports. The third-quarter total is 26,056,839 tons, and the tally for the first nine months of 1951 is 78,328,742 tons.

To turn out the September tonnage, steelmaking furnaces were operated at an average of 101 per cent of capacity. Details of the September performance follow:

	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated	
		Percent of		Percent of		Percent of		Percent of	weekly	Number of week
1951	Net tons	capacity	Net tons	capacity	Net tons	capacity	Net tons	capacity	production (Net tons)	in months
January	7,844,982	101.4	431,725	90.4	566,460	88.3	8,843,167	99.9	1,996,200	4.43
February	6,935,512	99.3	326,112	75.6	504,077	87.0	7,765,701	97.1	1,941,425	4.00
March	8,059,625	104.2	408,926	85.6	602,504	93.9	9,071,055	102.4	2,047,642	4.43
1st Quar.	22,840,119	101.7	1,166,763	84.2	1,673,041	89.8	25,679,923	99.9	1,996,884	12.86
April	7,857,161	104.9	392,472	84.9	590,888	95.1	8,840,521	103.1	2,060,728	4.29
May	8,071,270	104.3	408,650	85.6	614,579	93.7	9,094,499	102.7	2,052,934	4.43
June	7,667,811	102.3	403,001	87.1	586,148	94.3	8,656,960	100.9	2,017,939	4.29
2nd Quar.	23,596,242	103.9	1,204,123	85.9	1,791,615	95.0	26,591,980	102.2	2,043,965	13.01
1st 6 mo.	46,436,361	102.8	2,370,886	85.0	3,464,656	92.4	52,271,903	101.1	2,020,561	25.87
July	7,704,433	99.8	411,599	86.4	563,215	87.9	8,679,247	98.2	1,963,631	4.42
*August	7,693,322	99.4	436,822	91.5	603,448	94.0	8,733,592	98.6	1,971,465	4.43
†September	7,645,000	102.3	405,000	87.8	594,000	95.8	8,644,000	101.0	2,020,000	4.28
†3rd Quar.	23,042,755	100.5	1,253,421	88.6	1,760,663	92.5	26,056,839	99.3	1,984,527	13.13
†1st 9 mo.	69,479,116	102.0	3,624,307	86.2	5,225,319	92.5	78,328,742	100.5	2,008,429	39.00
1950										
September	7,262,359	100.7	409,216	88.7	533,422	91.7	8,204,997	99.4	1,917,055	4.28
3rd Quar.	21,805,573	98.6	1,194,651	84.4	1,329,869	85.8	24,330,093	96.9	1,868,248	13.13
1st 9 mo.	63,981,103	98.0	3,347,053	80.4	4,376,529	84.3	71,704,685	96.1	1,838,582	39.00

Note—The percentages of capacity operated in 1951 are calculated on weekly capacities of 1,746,337 net tons open-hearth, 107,806 net tons bessemer and 144,891 net tons electric ingots and steel for castings, total 1,999,034 net tons; based on annual capacities as of Jan. 1, 1951, as follows: Openhearth 91,054,020 net tons; bessemer 5,621,000 net tons; electric 7,554,630 net tons; total 104,229,650 net tons.
* Revised. † Preliminary figures, subject to revision.



FIRST STEP BY SUBCONTRACTOR: Production begins with this first pour of zinc alloy for drop hammer dies at Metal Products Division of Modglin Co. Inc., Los Angeles. Originally a manufacturer of plastic products, Modglin is now working on several million dollars of defense orders from Northrop Aircraft and Consolidated Vultee for tool engineering, tool manufacturing and production of aircraft subassemblies. Watching the initial pour are Mr. and Mrs. William N. Modglin, president and vice president respectively of the company

Subcontractors Attention: Two More Exhibits Coming Up

SMALL business firms will have opportunities to look over subcontracting possibilities at exhibits within the next month at Denver and Detroit. Parts to be farmed out, or blueprints and specifications will be available for inspection.

The Armed Forces Subcontractors Exhibit, in Denver, at the Denver University Arena, will be held Nov. 13-15. Prime contractors will display the component parts for which they want suppliers and will have representatives there to discuss tooling, tolerances and required production. Manufacturers interested in this exhibit should communicate either with Lt. Col. Rush Gibbs, USAF, or with Rolle Rand, Executive Director of the Colorado Development Council Inc., 522 Kittredge Bldg., Denver.

The other exhibit is the Prime Contractors Exhibit for Subcontractors to be held in the Agricultural building at the Michigan State Fair Grounds in Detroit Oct. 30 to Nov. 2. No advance registration is necessary for this exhibit. Most of the exhibitors represent the metalworking industries but space has been reserved by firms doing electronics, plastics, and packaging work.

Contracts awarded by the government, in excess of $250,000, are listed in the table.

Product	Contractor
Machine Tools & Production Equipment	Hoover Co., North Canton, O.
Machinery & Equipment	Western Electric Co. Inc., New York
	Briggs Mfg. Co., Detroit
	Hayes Industries Inc., Jackson, Mich.
	Frigidaire Division, General Motors Corp., Dayton, O.
	Buick Motor Division, General Motors Corp., Flint, Mich.
	Aircraft Division, Kaiser Metal Products Inc., Bristol, Pa.
	Bingham-Herbrand Corp., Fremont, O.
	American Products Co., Detroit
	Eaton Mfg. Co., Cleveland
	Thompson Products Inc., Cleveland
	AC Spark Plug Division, General Motors Corp., Flint, Mich.
	American Stove Co., St. Louis
	New Departure Division, General Motors Corp., Bristol, Conn.
	Elastic Stop Nut Corp. of America, Union, N. J.
Distillation Units	Cleaver-Brooks Co., Milwaukee
Snow Plows	Sicard Industries Inc., Watertown, N. Y.
Refrigerators	Warren Co. Inc., Atlanta
	E. Friedrich Inc., San Antonio, Tex.
Water Heaters	California Steel Products Co., Richmond, Calif.
Tent Stoves	Cribben & Sexton Co., Chicago
Turbosuperchargers	General Electric Co., Schenectady, N. Y.
Power Plants	Fairchild Engine Division, Fairchild Engine & Airplane Corp., Farmingdale, N. Y.
Fuel Servicing Trailers	Butler Mfg. Co., Kansas City, Mo.
Indicators, Altitude	Eclipse-Pioneer Division, Bendix Aviation Corp., Teterboro, N. J.
Indicators, Oil Pressure	Kollsman Instrument Corp., Elmhurst, N. Y.
Transmitters, Oil Pressure	U. S. Gauge Division, American Machine & Metals Inc., Sellersville, Pa.
Prefabricated Plumbing Sets	W. H. Singleton Co. Inc., Arlington, Va.
Automatic Gun, 20 MM, Spare Parts	Transducer Corp., Boston
Telescope Mounts	Crown Cork & Seal Co., Baltimore
Range Quadrants	Safety Car Heating & Lighting Co., New Haven, Conn.
Radio Sets	Safety Car Heating & Lighting Co., New Haven, Conn.
Amplifiers	Lewyt Corp., Brooklyn, N. Y.
Receivers, Transmitters	Wilcox Electric Co., Kansas City, Mo.
Static Converters	Wilcox Electric Co., Kansas City, Mo.
Generators	Varo Mfg. Co., Garland, Tex.
Transmission and Parts	Westinghouse Electric Corp., Pittsburgh
Transformers	Allison Division, General Motors Corp., Indianapolis
Components of Automatic Pilot	Eclipse-Pioneer Division, Bendix Aviation Corp., Teterboro, N. J.
Igniter Fuzes	Aerial Products Inc., Elkton, Md.
Hand Grenade Fuzes	Bayshare Industries, Elkton, Md.
Tank Automotive Spare Parts	Continental Aviation & Engineering Corp., Detroit

Small Business ???

Small business firms in the United States received 75 per cent of all contracts, and 30 per cent of the total dollar value of contracts awarded by the Army during the fiscal year ended June 30, 1951.

Of a total of 1,358,869 contracts let by the Army, small business firms received 1,029,805 with a value of more than $1.3 billion. These contracts are exclusive of thousands of subcontracts let to small business firms by prime contractors. For example, the Army's Walker Bulldog tank requires 2000 suppliers, representing 22 states, to furnish parts and materials for its construction.

Help for the Army

Two new versatile members of the defense team will soon be in mass production: A cargo tractor for the Army and an improved handie-talkie radio for the Signal Corps.

The MSE2 cargo tractor is so new that it hasn't been nicknamed yet. Built on the standard chassis of the Walker Bulldog light tank, the tractor will be used primarily to tow the 75 mm "Skysweeper" antiaircraft gun and other heavy weapons. Different body "kits" fit the tractor for pulling the 90 mm antiaircraft gun, the 155 mm gun, or the 8-in. howitzer, as well as acting as a wrecker, bulldozer, or stake-body truck. Allis-Chalmers Mfg. Co. is the prime contractor, and 25 subcontracts to midwestern plants have been awarded for producing components.

The handie-talkie radio will replace the old SCR-536 of World War II fame. Weighing about 6½ pounds, the radio can be slung over the shoulder, with the soldier able to speak into an attached headset. The new radio will be able to "net" with a number of other new frontline radio sets and to contact the powerful radios of company or battalion levels. In production on the new radio are Utility Electronic Corp., Waltham, Mass.; Emerson Radio & Phonograph Corp., New York; and Sentinel Radio Corp., Evanston, Ill.

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25. For copies of OPS orders, contact nearest OPS district or regional office. For copies of OPS news releases, write David S. Phillips, director, OPS Administrative Services Division, Temporary E Bldg., Washington 25.

Materials Orders

CONSUMER DURABLES — Amendment of Oct. 11, 1951, of NPA Order M-47A extends indefinitely the prohibition of the use of copper and aluminum for decorating or ornamenting consumer durable goods and related products listed in the order. An exception is made for products which are primarily ornamental or decorative in themselves.

COPPER—Direction 1 to NPA Order M-11 was revoked Oct. 10, 1951. This direction, which established a temporary procedure for distributors to use in obtaining brass mill and wire mill products from manufacturers, has been rendered unnecessary by issuance of NPA Orders M-82 and M-86.

OIL COUNTRY GOODS—Direction 1 to NPA Order M-46 and Direction 1 to NPA Order M-46A exempts Petroleum Administration for Defense allocations of oil country tubular goods from a recently issued direction to CMP Reg. 1. That direction requires shipments of controlled materials made later than seven days after the end of the quarter for which they were scheduled to be charged against the consumer's allotment for the succeeding quarter.

History Is Made

Mt. Cory, Ohio, comes into its own. Heretofore, this proud but undistinguished town in Hancock county had no historical fact nor significant statistic to call its own. Population: 302; manufactures: None; historical significance: None.

Now, however, Mt. Cory has been named the new geographic center of steelmaking capacity in the United States by American Iron & Steel Institute, based on Jan. 1, 1951, capacity figures.

Increases in steel capacity on the Pacific coast and in Utah, coupled with capacity increases in Michigan and along the shores of Lake Erie, moved the geographical center from Dola, Hardin county, O., 13 miles to the northwest, to Mt. Cory, henceforth definitely on the map.

Controlled Materials Plan

CONVERSION STEEL—Direction 8 to CMP Reg. 1 provides procedures under which consumers may continue under the established custom of utilizing conversion steel. Direction 8 was effective Oct. 1, 1951.

ALUMINUM—Amendment of Oct. 12, 1951, of CMP Reg. 2 reduces by 15 days—from 60 days to 45—the supply of aluminum a manufacturer may keep in inventory. Exempted from this reduction are manufacturers engaged in the military aircraft program whose authorized controlled materials orders are identified by the allotment symbol A-1. These manufacturers are still permitted to maintain a 60-day inventory of aluminum.

Price Regulations

ROUNDING OF PRICES—Amendment 18 of Ceiling Price Regulation 30 (machinery ceiling price regulation) permits manufacturers to round ceiling prices in a manner more nearly in line with standard industry practices. The change removes a limitation against rounding to the nearest cent or fraction of a cent where this resulted in a ceiling price increase of more than 1 per cent. Also, the change permits the rounding of ceiling prices to the nearest nickel on price list items from which a manufacturer customarily sells at established discounts. Amendment 18 was issued Oct. 10, 1951.

MACHINE TOOLS—Amendment 1 to Revision 1 of Supplementary Regulation 2 to Ceiling Price Regulation 30 extends to Nov. 15, 1951, the mandatory date for filing OPS Form 8 by machine tool manufacturers. Amendment 1 was issued Oct. 15, 1951.

COBALT — Amendment 8 of General Overriding Regulation 9 of the Office of Price Stabilization exempts from price control all sales of cobalt oxide. Amendment 8 is effective Oct. 22, 1951.

IRON & STEEL SCRAP—Amendment 4 of Ceiling Price Regulation 5 makes numerous changes in this iron and steel scrap price regulation, including specific ceilings for three additional grades of scrap. Amendment 4 is effective Oct. 22, 1951.

Government Orders Summarized

A guide to defense mobilization agencies' orders is now being issued by the Superintendent of Documents. Scheduled for monthly publication, it contains a summary of basic orders, regulations, delegations of authority and their amendments. Actions of all government agencies under the Defense Production Act are covered, together with information as to where various inquiries should be directed. Titled "Abstracts of Defense Regulations," the periodical is prepared by the Federal Register Division of General Services Administration's National Archives and Records Service. Subscription rate is $6 per year.

WORKING THE ANGLES: Fork trucks can pick up and handle loads with only half a turn, maneuvering in the aisles, when stacking is done at a less-than-90 angle to the aisle. This oblique stacking gives Dobeckmun Co., Cleveland, the use of valuable extra storage space that can be serviced by the fork trucks.

Tool Shipments Must Be Rated

Machine tool builders will be prohibited after Feb. 1 from shipping against non-rated orders, except for rare cases. Revision to take effect Feb. 1 amends NPA order M-41 that provides 70 per cent set-aside for military purposes, with the balance available for all other users, including those without ratings. The revision makes an exception where the builder doesn't have enough rated orders on his books to enable him to ship in the same dollar volume as during the first half of 1950. Under such circumstances he may ship enough tools against non-rated orders to bring dollar value up to that level.

NPA will attempt further to clarify the machine tool situation by establishing who may obtain machine tools with ratings. Clarification will come either by revision to M-1 or in a separate order.

A partial priority system has been instituted by the Armed Services to help tool builders decide which military-rated orders to ship first. Certain expansion programs will be given preference. At present, machines for jet engines and tank plants have first priority.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

Profit-limitation theory prevailing early this year is modified as government realizes necessity of keeping businesses healthy to pay taxes

FROM THIS TIME forward during the defense emergency period there will be no criticism from responsible government officials about profits earned by corporations.

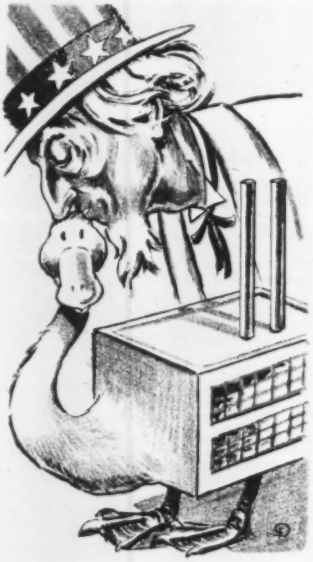
New philosophy is: Business, large and small, must earn substantial profits and should receive all help the government can give them in this direction. This is particularly so when business must be called on to shoulder a heavy portion of rearmament's monetary load. Revenues needed will be forthcoming only if business continues profitable; only a profitable business can pay high income taxes.

Ascent—By directive of Defense Mobilizer Charles E. Wilson, the above view now dominates policies of the Office of Price Stabilization and the Wage Stabilization Board. Uniform policy now is to allow increases necessary to keep wages abreast of the rising cost of living.

OPS has abandoned entirely its profit-limitation theory of early 1951. It now permits price determination on the basis of all costs and the usual markups. This trail was blazed by the recent remedial machine tool price order and by the decision to allow manufacturers to increase prices on their finished goods on the basis of higher prices they now have to pay for lead and zinc. Many more price boosts are slated for the months ahead.

Assent—Current view about price ceilings seem to be: Manufacturers will be given liberal price treatment so long as their profits views are "reasonable," and don't arouse public resentment, particularly from organized labor and farmers. They must stay within the confines of this broad definition to be on firm ground.

Sizing up this new trend, a veteran Washington observer makes this prediction: With the cost of government what it is, and with corporations serving as tax collectors for the federal government, we are nearing the stage where it will become absolutely unpatriotic for a corporation to fail to earn a liberal profit.



A BLESSING FOR BUSINESS
. . . profits help pay the tax bill

Better than Bloodhounds . . .

If you want to get in touch with the *right* government officials—on taxes, plant expansion, wages, financial assistance, procurement, research assistance, renegotiation, manpower and so on—be sure to provide yourself with the latest directories of key men in the defense agencies. Two of them recommended for use by the metals industries are those published in STEEL, Sept. 10 and Oct. 1, 1951, and by the General Services Administration. GSA's "Handbook of Emergency Defense Activities" lists all the departments and agencies which have any defense assignment whatever, and sets forth names, addresses and telephone numbers of all top officials. STEEL's directory goes further, listing the hundreds of subordinate officials (mostly men from industry) who are responsible for handling procurement and pricing problems connected with specific products.

You can get reprints of STEEL's "Who's Who in the Defense Organization" free by writing to STEEL, 1213 W. Third Street, Cleveland 13. Copies of GSA's "Handbook of Emergency Defense Activities" may be obtained for 30 cents from Superintendent of Documents, Government Printing Office, Washington 25.

Unlimited Substitutions . . .

Want to know what to substitute for the alloy steels you normally use? Then you'll want copies of a new government report covering NE (National Emergency) and boron steels. Compositions, hardenability, and suitable substitutions are discussed, and a bibliography is included. Order identification is PB 104922 and price is 10 cents; orders should be sent to Office of Technical Services, Commerce Department, Washington 25.

Back to Industry . . .

Norman W. Foy has resigned as assistant NPA administrator in charge of the Metals and Minerals Bureau, to return to his post at Republic Steel Corp., Cleveland. Direction of the bureau will be in the hands of S. B. Coolidge, deputy assistant administrator, until the end of October when, under the rotational arrangement, he will resume his duties with the Sherwin-Williams Co., Cleveland.

More Time for Reporting . . .

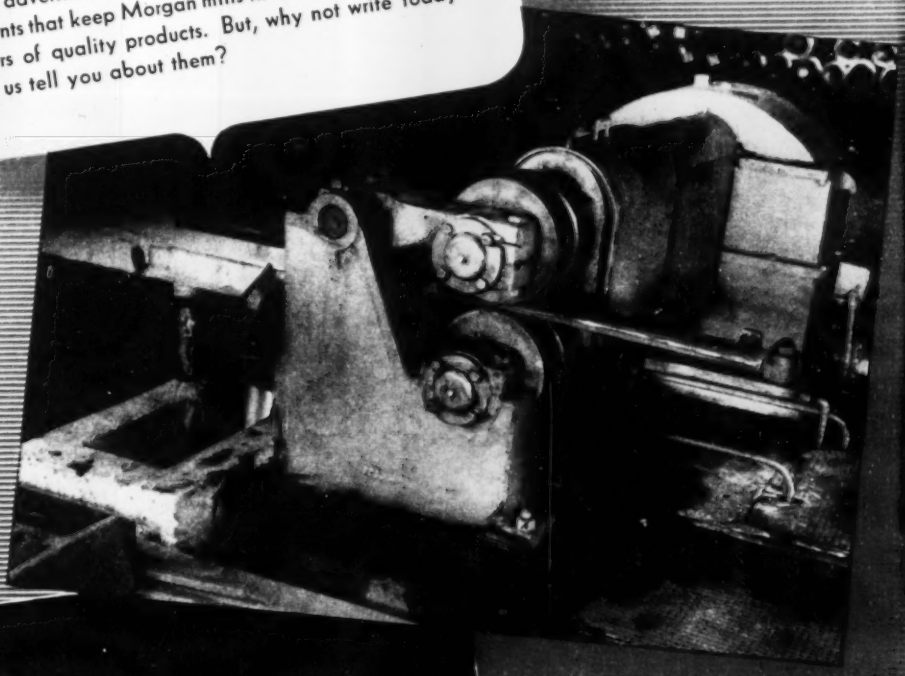
Contractors, including subs, whose contracts are subject to renegotiation have been given a little more time to file financial statements in the first order of the recently-organized Renegotiation Board. If your fiscal year ended before Nov. 30, 1951, you now have until Mar. 1, 1952, to file financial statements.

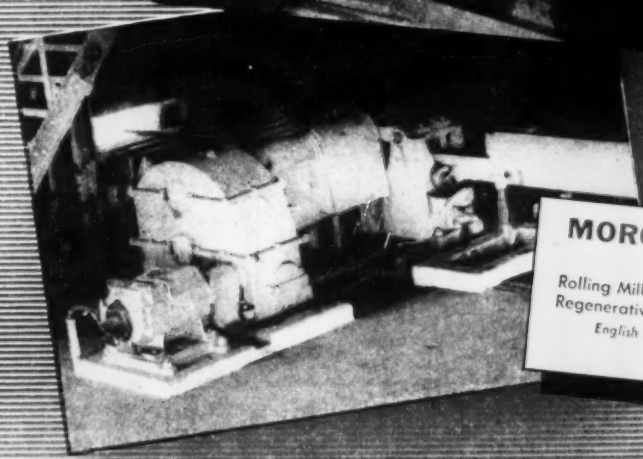
How's this for a "HOT ROD?"

This new Morgan development pushes billets out of their hellhole with remarkable efficiency and makes an easier and more comfortable job for the operator.

The pushout bar is water-cooled and reciprocated by a pair of power driven pinch rollers. Lateral motion of the unit is made hydraulically, enabling the operator . . . with finger-tip control . . . to align the pushout bar accurately with the next billet to be discharged.

Future advertisements will feature other pioneering developments that keep Morgan mills in the forefront as high producers of quality products. But, why not write today and let us tell you about them?





MORGAN CONSTRUCTION CO.

WORCESTER, MASSACHUSETTS

Rolling Mills - Morgoil Bearings - Wire Mills
Regenerative Furnace Control - Gas Producers - Air Ejectors

English Representative: International Construction Company
56 Kingsway, London, W.C. 2, England

RM-42

WHICH OF THESE HEAT-TREATING PROBLEMS IS YOURS?

Cost Reduction?
Increased Production Rates?
Quality Control?
Reducing Distortion?
Production-Line Heating?
Floor Space?

WESTINGHOUSE RF HEATING HELPED SACO-LOWELL SOLVE ALL SIX

Saco-Lowell Shops, makers of outstanding textile machinery, had always experienced problems with hardened bottom front rolls.

A Westinghouse 50 KW—450 KC RF Generator, with two standard vertical scanners, helped increase line production rates by 145% with total annual savings of $18,300.00. Direct labor costs have been cut 63%. Journal bearings are now ground after hardening, producing a higher quality roll. Formerly, every shaft required straightening; now this operation has been simplified and costs here reduced 70%.

Look at the results obtained by Saco-Lowell with a Westinghouse process that can handle *432* different rolls. Examine your heat treating problems. They, too, may be reduced, clarified, or eliminated entirely. Write to Westinghouse Electric Corporation, Induction Heating Section, 2519 Wilkens Avenue, Baltimore 3, Maryland. Write today.

J-02226

YOU CAN BE SURE... IF IT'S
Westinghouse
INDUCTION HEATING

British Trumps: Canada, S. Africa, Australia

Britain may have her troubles in Iran and Egypt, but the economies in the three most important Commonwealth nations are booming

BRITAIN lost an important trick in Iran; she's vulnerable in Egypt; but she still may make her game with trumps in Canada, South Africa and Australia.

The economies in those important Commonwealth nations are booming. "I see no ceiling on Canada's future," says W. C. Stolk, president of American Can Co., in ceremonies opening the firm's new multi-million dollar Chatham, Ont., container plant.

South Africa is destined to become "one vast United States of America," says C. W. Chapman, British industrialist and engineer who won fame during World War II for developing a 1000 hp high speed diesel engine.

Faith in Australian industry is typified by the move of Chrysler Corp. in helping to finance expansion of the Australian motor industry.

Lesser known areas in the British orbit aren't being neglected, for the mother country is investing more than $250 million in overseas development programs this year.

Seventy-Five Million Canadians?

American Can Co. President Stolk foresees a time when Canada, now supporting a population of an estimated 13.5 million, will have 75 million people living within its boundaries. The dominion's population in a decade has increased more than 17 per cent.

The economic records are falling right and left in the nation. In July its total export reached an alltime monthly peak of $379 million (in Canadian dollars).

Coal Lack Hits Australia

Coal is the major factor limiting Australia's expansion. Because of its lack, Australian steel plants are currently operating at only about 70 per cent of capacity. The land-down-under has the facilities to produce about 1.4 million net tons a year.

The shortage is dictating the mining of poorer grades, and one major project is to mine lignite at Yallourn, near Melbourne, in the state of Victoria. Other coal fields, only partly developed, exist at Collie in Western Australia and Blair Athol in Queensland. The Queensland government is pressing hard for a steel plant to be built within its boundaries, based on that coal and iron ore from New Caledonia. That and other steel expansions will come eventually, but for the moment the country's capacity is being increased by adding to existing facilities, notably at Newcastle, Wyallah and port Kemola.

West German engineering and machinery making firms are interested in Australian steel expansion and already have some contracts.

Biggest Boom: In South Africa

Of all the boom areas in the British Commonwealth, the Union of South Africa is the scene of the most sensational.

Foreign capital, particularly from Britain, has been flowing in since the end of World War II at a prodigious rate. An estimated $76 million in foreign funds flowed in during 1946, $720 million in 1947, $328 million in 1948, $150 million in 1949 and $168 million in 1950. The dollar-value drop in 1949 occurred because of the devaluation of the pound. The pound-rate of investment picked up to average in 1950, and this year it may reach an alltime high. U. S. business now has an estimated $100 million invested in the Union, most of it in plants to make autos, tires and other rubber products, office equipment, home appliances, oils, cosmetics and pharmaceuticals.

Although nature has been miserly in bestowing upon South Africa some economic resources—notably adequate rainfall, navigable rivers, fertile soil and plentiful timber—it has compensated for such shortcomings by providing the country with an elevated topography and temperate climate and a wealth of mineral resources, including gold and diamond fields, extensive deposits of iron and coal and various other minerals required for industrial use.

Despite the ample iron ore and coal, South Africa steel users are gripped by fierce shortage. Domestic production, most of it by the state-controlled Iscor at Pretoria and Vanderbijl Park, has hovered around 800,000 net tons for the past two years, although needs are estimated at 2,250,000 tons. Most of the balance has been imported, but this year not enough overseas material could be bought in a steel-hungry world.

Some relief is in sight because the present output of steel and other products at Pretoria and Vanderbijl Park will be doubled when extensions now in progress are completed. When expansions are finished, those two facilities will have the capacity to turn out nearly 1.5 million tons of ingots a year.

Carl McDow

THE HARD WAY: Port mechanization is needed in Portuguese East Africa, as attested by this crude method of loading chrome ore aboard a U.S. ship in Lourenco Marques. A gang of native Africans shovel the ore into large steel buckets that are hoisted into the ship's hold and dumped. Nearly a week is required to load 5000 tons of ore by this method. Compare that with U.S. iron ore loading docks where a greater tonnage is loaded in a few hours. Lack of railway and loading facilities is chief handicap in getting ore to the ships quickly, cheaply and efficiently

New Future for Old Tin Cans

Briqueting machine developed in the South compresses cans into small bundles for use in blast furnaces. Reclamation of 1 million tons of scrap yearly is foreseen

THE LOWLY tin can on the dump heap may have a glittering future after all. A briqueting process introduced by enterprising Southerners promises to prove the feasibility of rescuing it for use in blast furnaces—possibly to the extent of a million tons a year.

An automatic baling press has been developed by Steel Briquette Corp., Atlanta, and its president, Julius L. Chazen, that will compress tin cans into small charging size bundles at a rate of 2-2¼ tons per hour. First facility is now operating in the Memphis yard of Southern Tin Compress Corp., affiliate of F. Perlman & Co., Memphis, scrap firm in which Aaron Brenner and Saul and Louis Perlman are partners.

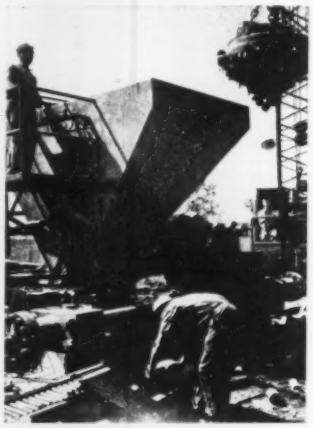
Royal Reception — Southern furnaces are already using loose tin can scrap. It's being charged into blast furnaces of Republic Steel Corp., Tennessee Products & Chemical Corp., and Sloss-Sheffield Steel & Iron Co. to reduce the otherwise high phosphorous content of pig iron. A Pittsburgh district mill has just contracted with F. Perlman & Co. for 500 tons of the briqueted cans; first shipment will be made in about 30 days. The scrap is not limited in use to blast furnaces: An electric furnace steelmaker is giving it a whirl too.

Mr. Brenner — highly enthusiastic about possibilities of the baling press —has ordered three more for delivery shortly after the first of the year. "This is no temporary operation," says Mr. Brenner, "and is not dependent upon a short market, subsidies or an emergency to exist. Even if prices go down, collections will be continued." Briqueted cans bring $4-$6 less than the price for heavy melting scrap. Tin plate, of course, is high quality steel, so scrap turned in gets the red-carpet treatment.

Tonnage Lost—Salvage potential is conservatively estimated at 1 million tons a year. In 1950 some 4.5 million tons of tin plate and short ternes were produced for use in can manufacture. About 25 million tons of tin can scrap have been lost in the past ten years, according to Mr. Brenner.

Cost of detinning containers that have been through incinerator plants and dumps is prohibitive because of volatilization and deterioration by the elements. Ninety per cent of this material isn't suitable for detinning—but it can be reprocessed for its ferrous content. Current users and metallurgical consultants have established that the tin does not contaminate the base metal because this material represents only a small percentage of total charge and because much of the tin volatilizes and goes into flue dust accumulation.

Kitchen Campaign — Detinning plants operated during World War II,



TIN CANS INTO BRIQUETS
. . . food for hungry blast furnaces

but shut down when the emergency ceased. They produced 400,000 tons of steel scrap and recovered 4000 tons of tin.

Government subsidized, the program relied on use of clean tin cans collected by householders and was instituted primarily for tin recovery. NPA has shown no inclination to involve the government in such a program again.

Cashing In—The City of Atlanta operates an incinerator and salvages about 5000 tons of tin cans per year for sale to Tennessee Products & Chemical Corp. One Atlanta scrap dealer, using a crusher that mashes containers, is currently turning out 5000 tons a year. Fulton county, in which Atlanta is located, shows an annual potentiality of 20,000 tons. New facilities added by the city will reclaim 10,000 to 12,000 tons yearly.

Transportation costs account for a major portion of the expense of handling loose cans. A large freight car is needed to carry 20-25 tons of cans, even if they are crushed flat. If briqueted, about 50-60 tons could be shipped per car, giving an advantage of $1 to $3 per ton in freight rates depending on distance shipped. The briquet also increases charging rate at furnaces by a ratio of 14 to 1 over crushed cans, as briquets weigh 40 per cent as much as solid steel.

Mechanics—The press developed by Steel Briquette Co. has rated capacity of 2000 psi. Completely automatic in operation, it is powered by a 75-horsepower Louis Allis motor and equipped with a Vickers hydraulic system. Approximately three cycles of operation take place per minute.

Chamber of machine measures 2 feet square and 8 inches deep. Cans up to 5-gallon size can be handled. Briquets produced weigh 35 pounds on the average, and are 5 x 5 x 12 inches in size.

Operation—Magnets are used with the first machine to load the hopper with tin cans. Later models are being equipped with a conveyor for loading the cans and another for carrying the briquets from the press to railroad cars. Conveyor will be used as a picking table to remove heavy materials that would foul the press. Operator can control the baler and conveyors from his position at the mouth of the hopper.

In cycle of operation, cans move from hopper into briquet chamber, and gathering ram compresses cans horizontally. Then second ram presses and ejects crushed bale, with third ram acting as a compression and release cylinder. This third ram retracts sufficiently to permit the completed briquet to drop from the chamber onto a conveyor.

A Look Ahead—Steel Briquette Corp. has already applied for certificates of necessity to build 12 more machines, at a cost of $500,000. Eventually, the plan is to make 100 of them for distribution on a lease basis. Also planned is a crusher mounted on a heavy industrial trailer for movement to yards and small towns baling accumulated cans periodically.

Aluminum Outlook Brighter

Aluminum production losses of Aluminum Co. of America will not be nearly as heavy in the Pacific Northwest as the company had expected.

Heavy rains in the drought-stricken area have restored water levels at hydroelectric sites to a point where Alcoa's losses will be about 2.2 mil-

tion pounds this year instead of the 8 million pounds originally anticipated.

Alcoa estimates its 1951 production will total 853.4 million pounds instead of the 855 million pounds originally planned.

Tack Lack: Customers

Biggest tack buyers, shoe and furniture makers, are in the doldrums

RIGHT NOW, you are probably stepping or sitting on a tack.

The industry making the Tom Thumb product, the tiny cut tack, wishes you were stepping or sitting on more, because the two largest tack consumers, shoe and furniture manufacturers, are in the doldrums. Even so, cut tack sales will probably total about $18 million in 1951, and the industry will consume close to 25,000 tons of slit hot-rolled steel sheets and an estimated 2000 tons of nonferrous metals.

Shortages, Again — The industry has enough steel, but not enough nonferrous metals, notably copper and copper-base alloys. Cut tacks are a B product under CMP and about 15 per cent of current production is going into defense, mostly for Armed Service shoes. Cut tacks are the most important industrially, although wire-formed varieties are also made. Atlas Tack Co., Fairhaven, Mass., makes both, but its wire tack volume accounts for less than 10 per cent of cut tack output. Atlas makes a complete line of tacks—more than 20,000 types, sizes, heads and colors.

Most of the tacks used in shoemaking actually don't end up in the shoe. In lasting operations for welt footwear, tacks are pulled and discarded after the welt is attached to uppers and the sole sewed to the welt. In certain types of heavy shoes, the tacks are left in. Shoe nails are retained in most heels and heel seats. Shoe nails are made by some tack manufacturers, and they are in the tack family although designated as nails. Another major tack customer, the auto industry, was lost ten years ago when builders stopped using the pound per car.

Mass Production—Tack plate for cut tacks is slit to various widths from a range of gages, depending on the ultimate tack size. The strip is fed into machines automatically shearing wedge-shaped pieces which are in turn cold headed. As the strip is fed through machines it is alternately turned to shear alternate surfaces. These tack machines turn out an average of 300 cut tacks per minute.

When Ezekiel Reed built the first tack machine in 1779 at Abington, Mass., a hustler could turn out 3000 tacks per day. Because of the dependency on the shoe business, tack shops sprang up where shoe factories were first established, notably in New England and to a lesser extent around Baltimore.

Important United States tack producers, besides Atlas, include United Shoe Machinery Corp., East Jaffrey, N. H.; D. B. Gurney Co., Whitman, Mass.; Shelton Tack Co., Shelton, Conn.; and Clendenin Bros.-Inc., Baltimore. United sells about 70 per cent of its output for shoes, the rest for hardware. Not more than 15 manufacturers are now making cut and wire tacks, although in the early 1900s 61 shops were producing cut tacks alone.

The American tack industry today has more capacity than at the turn of the century, but it has undergone a number of mergers.

Tool Engineers To Meet

A tool engineering conference, sponsored by the University of Illinois, is scheduled for Oct. 27 at the university's department of mechanical engineering, Urbana, Ill.

The morning technical session features two discussions: "Recent Developments and Applications of Metal Cutting Research," by M. E. Merchant, Cincinnati Milling Machine Co. and K. J. Trigger, professor of mechanical engineering, University of Illinois. A. O. Schmidt, Kearney & Trecker Corp., is chairman.

Second discussion deals with "Electronics Applied to Machine Tools," by G. H. Fett, professor of electrical engineering, University of Illinois and T. E. Johntz, General Electric Co. H. V. Loeppert, Boyd-Wagner Co., is chairman.

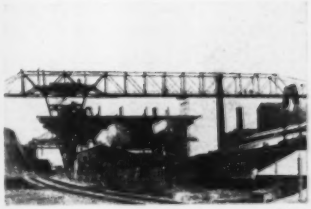
In the afternoon, engineers will hear two round table discussions concerned with "Metal Cutting Problems" and "Considerations in Depreciation and Replacement of Machine Tools."

Quick Switch Urged by PEI

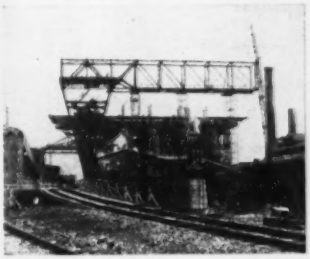
Conversion of porcelain enameling furnaces to defense heat treating applications has been recommended again by the Porcelain Enamel Institute as a quick, proven way to meet the demand for heat treat facilities.

PEI says that many porcelain enamelers successfully converted their furnaces for heat treating operations during World War II.

Bridge Crane Joins in . . .



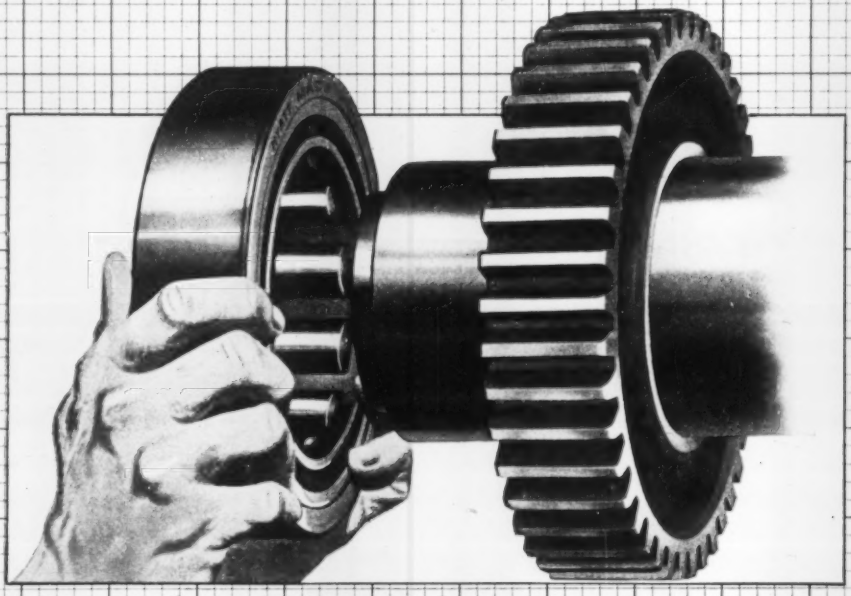
BIG boost for national scrap drive came from Diamond Alkali Co.'s Painesville, O. plant



DISMANTLING this crane helped Diamond Alkali ship more than 1000 tons of scrap in 2½ months

LAST support comes down as scrap piles up to be later loaded into gondola cars for shipment

. . . THE SCRAP



When Hyatts Go In —Bearing Wear and Care Go Out

Providing maximum load carrying capacity in a given space, unusual ability to withstand sudden shocks or abnormal temperatures, and permitting axial shaft expansion without binding . . . no wonder bearing wear and care go out when Hyatts go in.

Cars, cranes, tables, mill motors, and other auxiliary equipment last longer, run smoother, and require less maintenance with the application of these better Hyatt Roller Bearings.

Aware of this, equipment builders regularly design in Hyatts, and mill men make a practice of specifying them for tough jobs or using them as changeovers.

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At convenient locations, there are Hyatt steel mill bearing men to serve you. Hyatt Bearings Division, General Motors Corporation, Harrison, N. J., Pittsburgh, Chicago, and Oakland, Calif.

HYATT ROLLER BEARINGS

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

Ford is setting up a scientific laboratory specializing in fundamental research. It's headed by Andrew A. Kucher, formerly of Bendix Aviation and Frigidaire

DETROIT

WITHOUT THE hoopla which is considered customary for automakers, Ford Motor Co. has been going ahead with its organization and staffing of a scientific laboratory.

Only bits and pieces of the purpose of this unit have been put in circulation, but insiders say when it begins functioning in earnest it will fill an important need for the company outside the scope of present engineering research activities.

On Fundamentals—Like the research laboratories of General Motors, the Ford unit will be concerned with fundamental research and development on a broader scale than purely automotive problems. For GM this has meant extensive probing into petroleum chemistry, metallurgy, electricity and electronics, etc. GM's commercial activities, being on a wider base than those of Ford, necessitate a more comprehensive interest on the part of its research staff. Ford's scientific laboratory is dedicated solely to the field of transportation. But it is safe to assume that its staff's work will also spill over into other fields and will provide the groundwork on which non-transportation industries can erect commercial structures.

The scientific laboratory is directed by Andrew A. Kucher, an alumnus of two research positions —vice president in charge of research at Bendix Aviation and manager of research engineering, Frigidaire Division, General Motors. The lab's functions are divided into five engineering classifications: Physics, mechanics, chemistry, metallurgy and electronics.

New Officials—The physics section, concerned with problems of thermodynamics, high pressures and high speeds, is headed by Don M. McCutcheon, formerly head of the applied physics unit of Ford's manufacturing research department and well known for his work in development of metallurgical applications of radioisotopes. Head of the mechanics section is Paul Klotsch, formerly chief engineer of Crosley Motors. The chemistry section, which will delve primarily into study of fuels and lubricants, is under Charles E. Welling's wing. Mr. Welling is a pioneer in the field of butadiene, fuels and abrasives, at one time was in the research department of Phillips Petroleum and more recently was connected with the Mellon Institute. Don F. Frey, heading the metallurgy section which will have its primary interest in high temperature materials, had been assistant professor, department of chemical and metallurgical engineering, University of Michigan. A manager is yet to be named for the electronics section.

Home of the laboratory is the second floor of the central wing of Ford's new dynamometer building, the first unit in the company's $50 million research and engineering center, which is rising on a 500-acre tract in Dearborn. Mr. Kucher describes the lab's operation at this point as in the "pilot stage." It was created Apr. 1. Initially, 20,000 square feet of floor space has been assigned for the preliminary activities.

Messrs. Kucher and Klotsch are currently visiting several European countries for the purpose of dis-

TESTING, JUST TESTING: In burning desert heat, sometimes as high as 118 degrees, new Fords are tested at Ford's Arizona testing grounds near Phoenix. Trucks of International's test fleet roll over International Harvester Co.'s new seven and a quarter mile paved test track near Phoenix, Arizona. Trucks on the hill have just surmounted a long nine per cent grade and are heading down to a flat area now. The proving ground test fleet averages 34,000 miles a week in experimental and production quality testing. High altitude and cold weather tests are conducted in the mountains a few hours' drive to the north. Testing by the International fleet is done on a year-round basis in the Arizona sunshine

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cussing "engineering matters pertaining to long-range developments in the broad field of propulsion" with leading automotive and research people in England, France, the Netherlands, Germany and Switzerland.

New X-Ray for Ford Tanks

Don McCutcheon lent his talents temporarily to Ford's tank division when he helped A. E. Proctor Jr., manager of its chemical and metallurgical division, select a 15-million-volt betatron x-ray machine for installation some time next year in Ford's Livonia, Mich., tank facility now under construction.

Being built by General Electric's X-ray department, this betatron is not the highest voltage unit in use, but is according to Mr. McCutcheon, suited for inspection of the size sections to be used in Ford's medium tanks. Its magnet assembly was on display last week at the Metal Show here.

This betatron, Mr. Cutcheon says, will have a fairly large radiation field making it possible to x-ray large areas of material in one exposure. Intensity of its rays is such that imperfections in steel as small .042-inches in cross section can be be detected in 14-inch thick material.

GM Buys X-Ray Unit

A two-million-volt x-ray unit operating on different principles has been bought from GE by Fisher Body Division of GM for its use in medium tank armor inspection. Installation is planned for late this fall at Grand Blanc, Mich. X-ray speed of this unit is approximately 78 times that of the million-volt machines in common industrial use. At one stage electrons, "boiled off" the heated filament at one end of the multi-section tube, are traveling at the rate of 179,000 miles per second.

Capable of penetrating steel 10-inches thick in 48 minutes from a distance of three feet, the unit can be used simultaneously on a number of pieces arranged in a circle around it. The high voltage permits radiographing objects with thick and thin sections without fogging the plate behind the thinner material.

Auto, Truck Output

U. S. and Canada

	1951	1950
January	645,688	609,879
February	658,918	505,593
March	802,737	610,680
April	680,281	585,705
May	695,898	732,161
June	653,682	897,853
Six Mos.	4,137,204	3,941,878
July	522,858	746,801
August	571,442	842,335
September	491,608*	760,847
October	.....	796,010
November	.....	833,784
December	.....	671,622
Week Ended	1951	1950
Sept. 22	135,015	188,451
Sept. 29	113,973	187,030
Oct. 6	112,868	174,234
Oct. 13	121,351	174,234
Oct. 20	126,500*	188,323

Sources: Automotive Manufacturers Association, Ward's Automotive Reports. *Preliminary.

Platinum Gasoline: Platofuel

While much new in the way of metalworking developments was making history at the World Metallurgical Congress and Show, Oil Progress Week was also going on here. Speedway Petroleum Corp., Detroit, got the week off to a racing start with its announcement of a new gasoline which uses platinum as the catalyst in its manufacture.

Named "Platofuel," the gasoline, as described by Speedway's president, C. W. Sucher, "fits automotive engine requirements so well that the commonly accepted test methods used in the industry are not capable of fully evaluating the potentialities." According to him, gasoline produced by the platinum refining process produces more usable BTUs per gallon and burns without leaving any residue. This new refining method, which required expenditure of about $4 million for facilities, does not dispense with addition of tetraethyl lead for high test gas, but does, Mr. Sucher claims, raise the octane rating three to five points. Capitalizing on the troubles some of the present high-compression engine cars are beginning to have because octane ratings of many gasolines have slipped since teraethyl lead went under allocation, Mr. Sucher declares that the new refining process is capable of producing gasolines which "cannot be made to knock in any standard-make automotive engine now on the market."

From a cost standpoint, the process using platinum is expensive, but yield of fuel is said to be considerably higher than is possible using conventional methods. This greater recovery, Mr. Sucher says, makes it possible for Speedway to sell Platofuel at the same price as its previous gasoline.

GM Offers Selling Booklet

Another aid to companies seeking defense subcontracts is a new booklet which General Motors has put out entitled "Selling to GM." Containing a directory of its 39 manufacturing divisions and listing the civilian and defense products each makes, the booklet suggests that prospective suppliers contact the purchasing departments of the divisions or plants which interest them.

For those suppliers who may still be in doubt after scanning the list, the company suggests writing to its newly organized central clearing house for supplier information, the GM Procurement & Schedules Department, Room 14-262, General Motors Bldg., Detroit 2.

Nash Adds to Rambler Line

One by one, Nash is expanding its line-up of Ramblers. Four have previously been introduced—a convertible, two station wagons, and a hard top. Latest is a commercial utility vehicle, which could pass for one of the station wagons but lacks the rear seat and has fixed rear side windows. Dubbed the "Deliveryman," it has an all-steel platform more than six feet long with the tail-gate down. With tail-gate closed the inside cargo space is more than 52 cubic feet. Dimensions and power plant are the same as in other Ramblers.

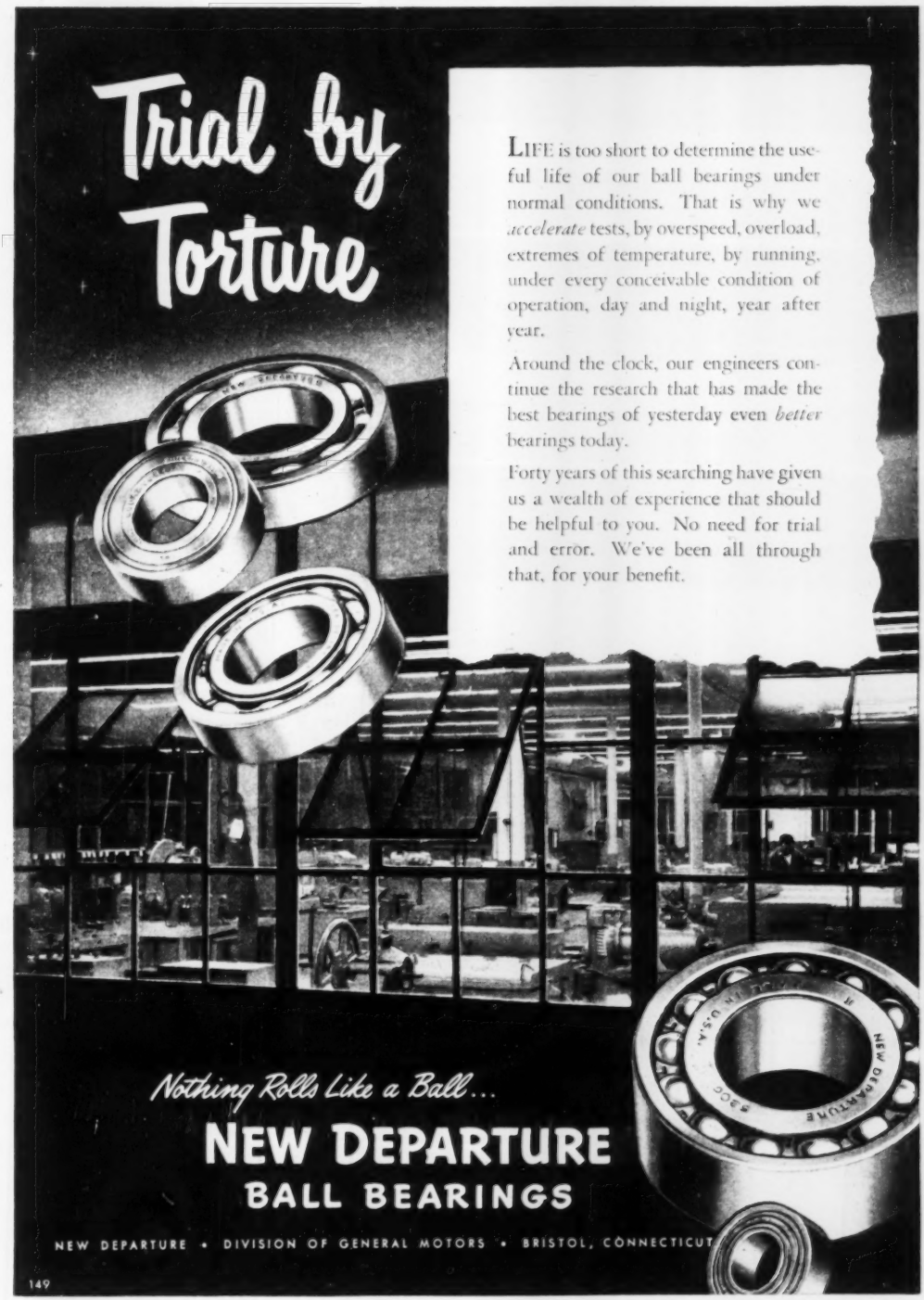
The utility car has been classed by the Federal Reserve Board as a commercial vehicle and as such is not subject to Regulation W's credit restrictions. Boasting extremely good gas economy and maneuverability, the Deliveryman is going to make some of the light pick-up and panel truck producers take a good hard look at their product.

Trial by Torture

LIFE is too short to determine the useful life of our ball bearings under normal conditions. That is why we *accelerate* tests, by overspeed, overload, extremes of temperature, by running, under every conceivable condition of operation, day and night, year after year.

Around the clock, our engineers continue the research that has made the best bearings of yesterday even *better* bearings today.

Forty years of this searching have given us a wealth of experience that should be helpful to you. No need for trial and error. We've been all through that, for your benefit.



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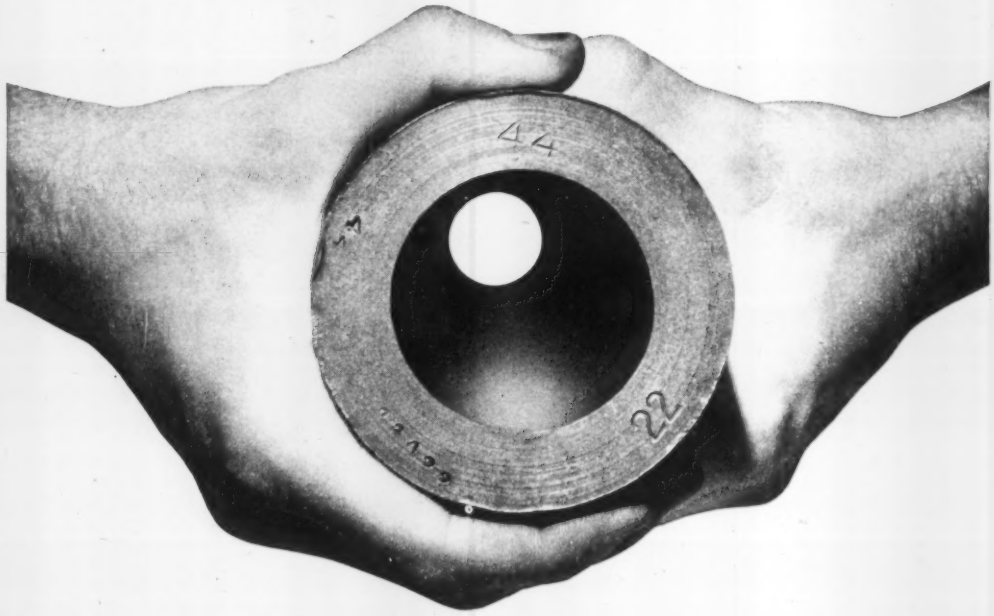
149

How to add machining capacity without adding machines



YOUR machine tools become more productive when you use Timken® seamless tubing instead of bar stock for hollow cylindrical parts. Timken tubing has the center hole already there. Drilling is eliminated. Finished boring is often your first production step. As a result, screw machine stations are released for other operations.

You save steel, too, by using seamless tubing. Since the hole is already there, there's less metal that has to be machined away. You get more parts per ton of steel. And to further assure savings in material, the Timken Company provides a tube engineering service which recommends the most economical tube size for your job—*guaranteed* to clean up.

All this and better quality too! Because the piercing process by which Timken seamless tubing is made is basically a forging operation, you have fine forged quality in your product—greater strength and toughness. And from tube to tube and heat to heat, this quality is always uniform. It's rigidly checked at every step in production. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

TIMKEN
Fine Alloy
STEEL
and Seamless Tubes

Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing.

The Business Trend

Business pendulum should swing slowly upward as stimulants gradually overbalance depressants. Industrial production index edges higher

EQUAL PRESSURES from expansive and contractive forces have been keeping the economy in a rough sort of balance. But pressure from the former is rising, and the latter slowly diminishing — indicating the start of a gradual rise in total business that may well continue throughout 1952.

Depressants to business, on one hand, have been the consumer sales slump, materials and production controls, high taxes, credit restraints and caution in making business loans, heavy personal savings and high inventories throughout most of the year. Stimulants have been huge defense outlays, heavy schedules for plant-equipment expenditures by private industry, a swelling labor force and higher wages (coupled with steady prices), and increasing industrial potential.

Supporting the business upturn are signs that consumers are snapping out of their buying lethargy (spendable income rose $2 billion in August to an annual rate of $254.4 billion). Other expansion indications can be seen in leveling out of inventories, relaxation of credit regulations, spiral of arms spending and heavy anticipatory buying by industry.

Production is still rising from its summer lows. As was expected, the Federal Reserve Board revised its September index upward 2 points to 220 per cent of the 1935-1939 average. That's seven points above July and only three points away from the year's high. Improvement in STEEL's weekly index of industrial activity was seen in the week ended Oct. 13. Paced by a rise in auto assemblies, the index edged up 2 points in that week to 214 per cent of the 1936-1939 average.

Pacing Rearmament: Steel . . .

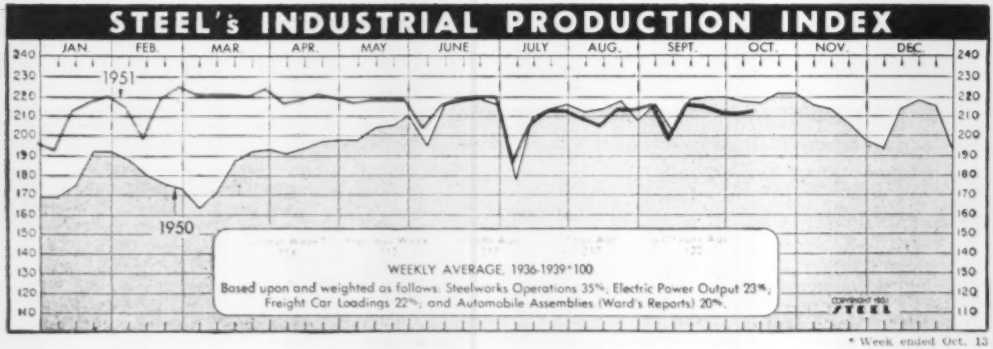
Tremendous contribution of the steel industry to the nation's armament effort is seen in weekly production figures for the year to date. In only nine weeks of 1951 to date have operations fallen below capacity, and only twice since mid-March. New capacity being added promises to insure weekly pourings of at least 2 million tons, even allowing for normal downtimes for repairs. Whether the pace can be continued for the rest of the year is problematical. Facilities aren't being maintained at peak efficiency because of unprecedented demand; scrap shortages and scattered labor troubles could hurt output. Schedules for the week ended Oct. 20 set a 6000 ton higher goal than the week before: Production was calculated to be 2,041,000 net tons of ingots and steel for castings.

Pickup in Autos . . .

Much less of this steel is being used in Detroit auto shops this year. Paring of assembly rates since midyear has accounted for loss of nearly 725,000 units from last year's pace. *Ward's Automotive Reports* estimates that 4,446,000 cars and 1,174,000 trucks have left U. S. plants so far this year. Operations in U. S. and Canadian plants during the week ended Oct. 13 picked up a bit over the previous one. Car and truck completions added up to 121,351, compared

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	101.5	101.0	100.0	101.5
	Electric Power Distributed (million kilowatt hours)	7,160	7,156	7,138	6,509
	Bituminous Coal Production (daily av.—1000 tons)	1,813	1,842	1,539	1,914
	Petroleum Production (daily av.—1000 bbl.)	6,330	6,338	6,282	5,872
	Construction Volume (ENR—Unit $1,000,000)	$241.9	$421.9	$189.2	$156.7
	Automobile and Truck Output (Ward's—number units)	121,351	112,868	136,150	174,234
	*Dates on request. †Weekly capacities, net tons: 1951, 1,999,635; 1st half 1950, 1,906,268; 2nd half 1950, 1,928,721.				
TRADE	Freight Car Loadings (unit—1000 cars)	865†	859	851	889
	Business Failures (Dun & Bradstreet, number)	126	123	164	188
	Currency in Circulation (in millions of dollars)‡	$28,448	$28,320	$28,216	$27,339
	Department Store Sales (changes from like wk. a yr. ago)‡	2%	+3%	−2%	+9%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$14,901	$17,501	$14,918	$14,889
	Federal Gross Debt (billions)	$257.0	$257.2	$256.6	256.5
	Bond Volume, NYSE (millions)	$12.4	$15.9	$16.4	$15.6
	Stocks Sales, NYSE (thousands of shares)	7,445	10,231	10,929	9,259
	Loans and Investments (billions)†	$71.2	$71.4	$70.4	$68.7
	United States Gov't. Obligations Held (millions)†	$30,878	$31,212	$30,768	$33,694
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	171.92	171.92	171.92	157.29
	STEEL's Nonferrous Metal Price Index‡	234.9	234.8	224.6	225.5
	All Commodities†	177.3	177.1	176.9	168.5
	Metals and Metal Products†	190.9	190.9	188.2	177.6
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1951
1950
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
STEEL

* Week ended Oct. 13

with 112,868 units produced the week before. Pickup in passenger car sales is seen in new registrations. August figures showed new car registrations topped the number of vehicles built for domestic market by about 60,000 units; field stocks shrunk appreciably.

Buyers Cheer Up . . .

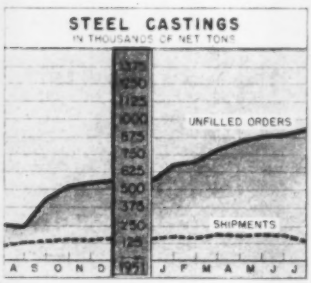
Deliveries in September weren't nearly as bad as a year earlier, Purchasing Agents Association of Chicago finds in its September business survey. Its members believe the way open to further inflation—probably restrained. Slower deliveries, higher prices, more employment and larger order backlogs all point to inflation, but stability of inventories plus ability to increase production will have a moderating influence, says the survey committee.

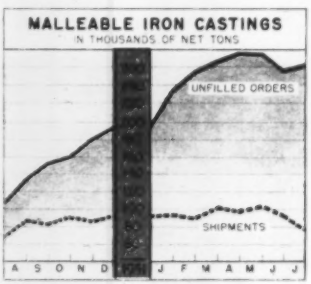
No Price Runaway . . .

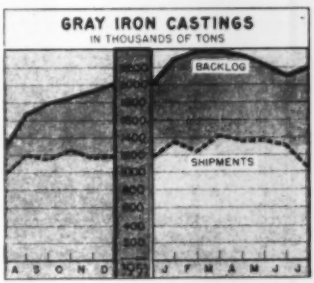
Prices won't be going up much in the next few months, says the Department of Agriculture after a survey of the demand and price situation. The department's Bureau of Agricultural Economics sees several brakes on prices in spite of continued high level consumer buying power. Chief deterrent to a price spiral will be the fast build-up of industry's power to produce. High inventories of many consumer goods will also contribute, as will record output of farm products. Strong demand for most goods and services in the near future is predicted by the bureau. Prices currently show no signs of getting out of hand, but the downward trend since summer has been checked. For the fourth straight week, primary market prices rose in the one ended Oct. 9

Inventory Picture Rosier . . .

First decline in book value of business stocks since July, 1950, occurred in August. At the beginning of September total business inventories were







Steel Castings
Thousands of Net Tons

	Shipments 1951	Shipments 1950	Unfilled Orders* 1951	Unfilled Orders* 1950
Jan.	174.1	89.1	675.4	142.5
Feb.	164.0	91.8	707.4	165.2
Mar.	190.7	141.8	779.7	185.6
Apr.	181.9	107.0	846.9	201.6
May	189.2	117.9	881.7	198.0
June	184.7	131.1	895.1	206.8
July	146.5	98.3	930.0	255.4
Aug.	....	128.4	....	239.9
Sept.	....	134.6	....	428.0
Oct.	....	149.6	....	521.8
Nov.	....	145.9	....	537.7
Dec.	....	145.3	....	554.2

* For sale, U. S. Bureau of the Census

Malleable Iron Castings
Thousands of Net Tons

	Shipments 1951	Shipments 1950	Unfilled Orders* 1951	Unfilled Orders* 1950
Jan.	92.5	62.9	234	62
Feb.	89.0	60.4	255	67
Mar.	101.7	66.3	267	70
Apr.	97.3	69.8	276	76
May	100.8	76.2	275	77
June	93.7	82.3	256	87
July	76.8	67.5	263	105
Aug.	....	86.0	....	132
Sept.	....	82.5	....	153
Oct.	....	90.0	....	160
Nov.	....	85.2	....	180
Dec.	....	91.5	....	195
Total	....	920.6	....	....

* For Sale, U. S. Bureau of the Census

Gray Iron Castings
Thousands of Net Tons

	Shipments 1951	Shipments 1950	Backlogs* 1951	Backlogs* 1950
Jan.	1,364	913	2,298	914
Feb.	1,251	864	2,392	873
Mar.	1,410	906	2,390	922
Apr.	1,363	981	2,337	922
May	1,396	1,095	2,229	978
June	1,309	1,136	2,162	1,040
July	1,029	961	2,208	1,287
Aug.	....	1,202	....	1,670
Sept.	....	1,159	....	1,794
Oct.	....	1,255	....	1,840
Nov.	....	1,161	....	1,930
Dec.	....	1,182	....	2,012
Total	....	12,905		

* For Sale, U. S. Bureau of the Census

Charts—Copyright 1951, STEEL

$69.7 billion, says the Office of Business Economics. Book value dropped $200 million below the end of July. Manufacturers' inventories increased about $650 million (not unusual in time of rearmament), while retailers' and wholesalers' shelves were cleaned of goods worth $550 million and $300 million, respectively. Stocks of durable goods rose $0.6 million to $20.2 million and nondurables dropped $0.1 million to $20.7 million. These changes actually represent lower costs, so aggregate inventories rose slightly on a volume basis.

Arrival of stability in business inventory figures—after the dizzy rise of almost a year—is perhaps the most significant factor seen in third-quarter business, says the National Industrial Conference Board. Liquidation of inventory could be the basic fact of the fourth quarter, it believes, and would raise a new set of possibilities for the time schedule of inflation.

Steel Industry Payroll High . . .

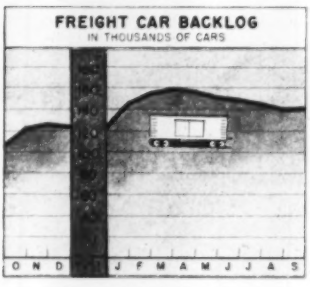
Payroll of the iron and steel industry in the first eight months of this year—$1.9 billion—is nearly equal to the entire annual payroll in each of 1947 and 1949. August payroll was $246,670,000, almost 20 per cent higher than one year earlier. Employment increased in August, setting a new record at 679,100 persons. Wage earners worked an average of 40.4 hours a week in August, and hourly payments to them averaged $1.931.

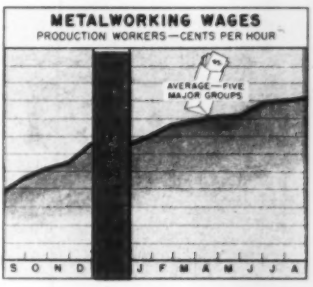
Trends Fore and Aft . . .

Railroads expect to spend a billion dollars for improvements in the coming year . . . Holiday trade should be 5 per cent higher than last year, says National Association of Credit Men . . . Total employment in September was 61,580,000 . . . Television industry officials say 1951 output will top 5 million sets. Last year 7.4 million were produced . . . Industry shipments of gas ranges in the first eight months of 1951 approximated 1,786,400 units, 19.2 per cent under the same period last year . . . Industrial construction awards dropped 75 per cent to $53.6 million in the week ended Oct. 11.

Issue Dates of other FACTS and FIGURES Published by STEEL:

Construction Sept.24	Gear Sales Oct.15	Ranges, Elec. Sept.24
Durable Goods Oct.8	Indus. Production..Oct.1	Ranges, Gas Sept.24
Employ., Metalwk...Oct.8	Ironers Sept.17	Refrigerators Oct.1
Employ., Steel ...Oct.8	Machine Tools Oct.8	Steel Forgings Aug.20
Fab. Struc. Steel....Oct.15	Prices Oct.1	Steel Shipments ...Aug.27
Foundry Equip. Oct.15	Pumps, New Orders July9	Vacuum Cleaners ..Oct.1
Furnaces, Indus. ...Oct.15	Purchasing Power...Oct.8	Washers Sept.17
Furnaces, W. Air..Sept.17	Radio, TV Oct.15	Water Heaters Oct.1





Freight Car Awards and Backlogs

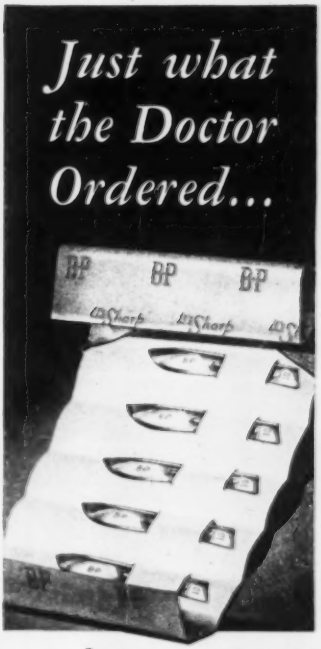
	Awards		Backlogs*	
	1951	1950	1951	1950
Jan.	26,356	9,376	144,758	19,026
Feb.	15,947	9,065	154,861	26,055
Mar.	11,271	6,201	158,619	30,539
Apr.	6,628	3,298	155,871	32,857
May	4,919	11,636	150,628	42,300
June	6,793	2,095	147,725	40,585
July	2,417	30,065	144,810	67,084
Aug.	1,828	23,850	139,014	86,156
Sept.	9,657	25,111	140,135	106,611
Oct.	.....	21,886	.....	122,148
Nov.	.....	10,573	.....	126,870
Dec.	.....	3,326	.....	124,489
Total		156,482		* End of month

American Railway Car Institute

Metalworking Hourly Wages
(cents)

Production Workers—Five Major Groups					
	Prim.	Fab.	Mach-	Elec.	Trans.
1950	Mtls.	Prod.	inery	Mchy.	Equip.
Aug.	163.9	153.9	160.7	146.7	173.5
Sept.	166.9	156.1	162.6	148.5	177.0
Oct.	166.6	157.6	165.5	152.3	178.1
Nov.	167.8	158.0	167.5	153.9	179.0
Dec.	175.8	161.0	169.8	155.5	181.6
1951					
Jan.	178.9	162.2	171.6	155.6	180.6
Feb.	177.9	163.5	172.6	156.9	181.5
Mar.	179.7	165.2	174.5	158.2	183.8
Apr.	175.8	165.5	174.9	158.8	182.9
May	179.9	165.5	175.0	160.4	183.3
June	183.6	166.4	176.4	162.1	186.1
July	183.7	166.2	175.7	162.7	187.0
Aug.	183.0	166.1	176.5	164.7	188.4

U. S. Bureau of Labor Statistics



. . . a better way to stop rust of surgical blades

Rejects, due to traces of rust, had to be stopped! Too often exported surgical blades were bouncing back into the lap of the maker — a Connecticut firm, Bard-Parker Company.

All this, in spite of a hot oil bath for the blades following a blast of hot air, then an overwrap of waxed paper. While new machinery was being considered for additional wrapping, Bard-Parker explored the new vapor that stops rust without oil.

Results of laboratory tests quickly focused attention on Angier VPI* Wrap. While control packs of oil-covered blades showed rust spots, blades simply wrapped in Angier's chemically coated paper came through rust free.

Little wonder overseas customers praise the new vapor pack! No more oil to remove, means no more handling. This assures factory-sharp blades for surgeons. Now rejects due to rust are unknown.

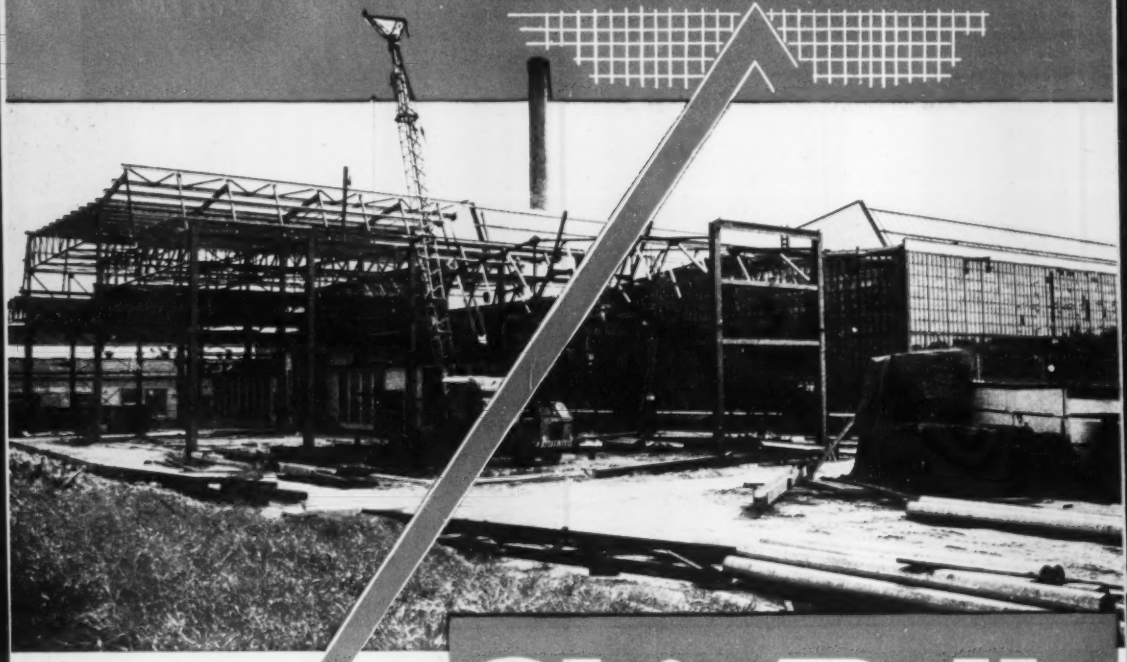
So simple and *clean* is this oilless packaging method, that now VPI protects Bard Parker domestic shipments, too.

Angier—most experienced name in vapor rust preventives—offers research and technical help to *you*. Distributors in principal cities. Write: Angier Corporation, Framingham 8, Mass.

Angier VPI Wrap*

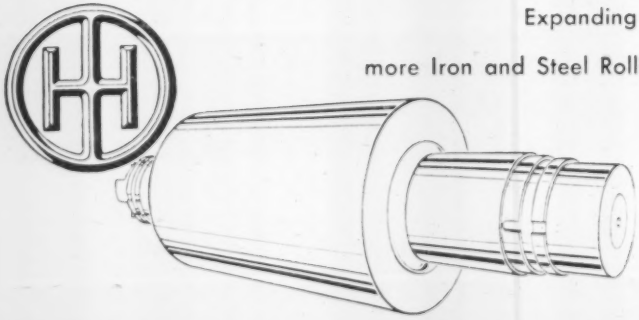
*U. S. Pat. Off.—Vapor Rust Preventive

Stepping UP Steel Production



with more Ohio Rolls

Expanding our machining facilities to produce more Iron and Steel Rolls is Ohio Steel's part in STEPPED-UP steel making capacity.



THE OHIO STEEL FOUNDRY CO.

LIMA, OHIO — Plants at Lima and Springfield, Ohio

Men of Industry

JOSEPH T. THAYER JR.
. . . chief sales engineer at Disston

WILLIAM IRRGANG
. . . exec. V. P. of Lincoln Electric

ARTHUR H. SY
. . . V. P. sales, American District Steam

Joseph T. Thayer Jr., formerly supervisor of chain saw service for **Henry Disston & Sons Inc.,** Philadelphia, was named chief sales engineer for the company. He joined Disston in 1947.

James R. Moran, former industrial and labor relations consultant in Pittsburgh, was appointed director of industrial and labor relations, **Ingalls Iron Works Co.,** Birmingham, and its subsidiaries. Prior to opening his Pittsburgh office, Mr. Moran was director of labor relations for Ingalls Shipbuilding Corp. at its Pascagoula, Miss., shipyard. He will make his headquarters at Birmingham.

J. C. Schwingle, former purchasing engineer of **Ingalls Shipbuilding Corp.,** Pascagoula, Miss., was appointed director of purchases, and **Charles J. Petty Jr.,** assistant purchasing engineer, was promoted to purchasing agent. **Donald L. Musselman** was named assistant purchasing agent.

Archie K. Beard was appointed midwest sales manager of **Turco Products Inc.,** Los Angeles. **Harold P. Glavin** was named general manager, midwest division factory of Turco, with headquarters in Rockdale, Ill. Mr. Beard, formerly Cleveland district manager, was transferred to Chicago where the organization's Chicago-Cleveland operation is now consolidated.

D. V. Perry, eastern district manager of **DeVilbiss Co.,** Toledo, O., was named assistant sales manager of the spray painting and finishing division. **C. B. Gracely,** Houston manager, becomes eastern district manager, with office in Newark, N. J. Mr. Perry will be located in Toledo.

William Irrgang was elected executive vice president of **Lincoln Electric Co.,** Cleveland. He joined Lincoln in 1929 and for the last 23 years has been engaged in various phases of plant operation. For the last six years he was director of plant engineering.

Apex Smelting Co., Chicago, announces that **Louis Lippa,** vice president, assumes the office of treasurer formerly held by **George Starmann Sr.,** retired. Mr. Lippa also assumes the duties of vice chairman of the board. **Robert K. Beck,** vice president, assumes the office of general manager of all operations, and **Fritz Nussbaum,** vice president, becomes manager of raw material purchases for all plants. **A. J. Peterson** was promoted to vice president-sales and advertising; **D. L. Palmer,** assistant vice president and Cleveland works manager.

KENNETH H. GAYLE JR.
Elected president, Ingalls Iron Works Co., Birmingham. Noted in STEEL, Oct. 1 issue, p. 60

American District Steam Co. Inc., North Tonawanda, N. Y., appointed **Arthur H. Sy** as vice president in charge of sales. He has been sales manager since 1946.

Thomas Payton, formerly service manager, was named assistant sales manager, commercial equipment division, **Cory Corp.,** Chicago. **Walter W. Rogers,** formerly assistant service manager, was appointed national service manager for the newly consolidated service department of Cory and its divisions, Fresh'nd Aire Co., Nicro Stainless Steel Products Co., and its subsidiary, Flavor-Seal Corp.

Battelle Memorial Institute, Columbus, O., promoted four of its research staff to supervisory positions: **Dr. Horace J. Grover** was named supervisor of research on fatigue and structural analysis; **Arthur D. Schwope,** supervisor of research in mechanical metallurgy; **Henry A. Saller,** supervisor of research on special metallurgical materials; and **Charles F. Lucks,** supervisor of the institute's instrument division. **Lloyd R. Jackson** was named an assistant director of Battelle.

Harold F. Mowry was appointed assistant treasurer, **American Cladmetals Co.,** Carnegie, Pa.

A. C. Picard of Quebec was elected a director of **Tungsten Corp. of Canada Ltd.**

Solar Steel Corp. appointed **Leo Haggerty** assistant sales manager, Detroit division, and **Louis C. Rudel** assistant sales manager, bar and tube division, Detroit. **Harry D. McQuown**

was appointed assistant sales manager, Cleveland division.

James F. Murray was elected a director of **Rigidized Metals Corp.**, Buffalo. He is president of Winsmith Inc., Springville, N. Y.

JAMES F. MURRAY
. . . a director of Rigidized Metals

Trailmobile Inc. established a factory branch in Birmingham and appointed **W. C. Griffin** as manager.

Wilford H. Magee succeeds **Delmer Q. Bowman** as Houston district manager for **Earle M. Jorgensen Co.** Mr. Bowman was recently appointed manager of mid-continent operations for the company. **James R. Tams** becomes assistant district manager in Houston, and **Lester B. Tolson**, assistant district manager of the Dallas warehouse.

Samuel P. Owen, formerly assistant advertising manager of Skilsaw Inc., was appointed advertising manager of **Rockwell Tools Inc.**, Columbus, O. Prior to this appointment he served in a copy, contact and planning capacity with a Chicago advertising agency for all divisions of Rockwell Mfg. Co.

Baker-Raulang Co., Cleveland, elected to the board of directors **Joseph Joiner Jr.**, vice president, Maritime Petroleum Corp.; **A. Douglass Hall**, financial vice president, Diamond Match Co.; **George Miller**, president, Strong Cobb & Co. Inc.; **Wesley A. Stanger Jr.**, partner in Riter & Co.; and **Robert H. Davies**, vice president, Baker-Raulang. These new members replace **S. Livingston Mather, R. C. Norton, Laurence H. Norton, Irving C. Bolton** and **Clarence M. Taylor**, resigned. **William A. Bauer**, Hemphill, Noyes, Graham, Parsons & Co., was elected chairman of the board.

Harry L. Swan, in charge of advertising for **Willys-Overland Motors Inc.**, Toledo, O., since 1946, was appointed advertising and merchandising director. **Don H. Smith** was appointed sales promotion manager.

Frank Zacher was named director of personnel for **Norton Co.**, Worcester, Mass. He was supervisor of factory training.

George M. McTavish was appointed manager of the government department of **U. S. Rubber Co.'s** tire division, Detroit. He succeeds **Lawler B. Reeves**, promoted to sales manager, U. S. tires.

William V. Shakespeare was appointed sales manager of Thor export sales division, New York, **Independent Pneumatic Tool Co.**

Arthur D. Little Inc., Cambridge, Mass., opened an office in Mexico City to serve Latin American clients, and placed **Richard W. Plummer** in charge.

RICHARD W. PLUMMER
. . . heads Latin American office

Dumas Steel Corp., Pittsburgh, announces the resignation of **H. J. Mokate**, general manager of sales.

Sundberg-Ferar, Detroit, announces that **Richard W. Steiger** has joined its staff as a designer.

Trimont Mfg. Co., Roxbury, Mass., a division of Aetna Industrial Corp., announces changes in management: **Frank P. Regan** was named divisional president to succeed **A. E. Kvating**, resigned. Mr. Regan continues as general sales manager. **Franklin P. Aiton** continues as vice president and comptroller, and **Mario Calello** is general plant superintendent.

L. R. Ludwig was appointed director of engineering and research for **Westinghouse Electric Corp.'s** Atomic Power Division, Pittsburgh. He succeeds **F. R. Benedict**, who is assuming new engineering responsibilities in the headquarters office of the company.

A. Lyson has returned to his position as sales manager with **T. A. B. Engineers Inc.**, Chicago.

Victor G. Muzzulin was appointed to succeed the late **Harry W. Benton** as plant engineer of **Niles-Bement-Pond Co.**, West Hartford, Conn.

John F. Carroll was named manager of product planning, **Hotpoint Inc.**, Chicago.

Charles T. Scott was appointed special sales representative in the Chicago area for **Heil Co.**

H. Arnold Cowan was named production manager of **Canadian Aviation Electronics Ltd.**, Montreal. For the last few years he was president and owner of Cowan Goodridge Standard Co.

Harry E. Henning joined **D. G. Teeling Co.**, Indianapolis, as sales engineer. He was regional sales director of Super Vend Sales Corp.

Paul E. Wilson was appointed exclusive representative for **Hydro-Line Mfg. Co.'s** air and hydraulic cylinders in the Chicago and northern Illinois territory.

Owen R. Rice was named vice president and manager, **Freyn Engineering Department**, engineering construction division, Koppers Co. Inc. He succeeds **W. Cordes Snyder Jr.**, resigned to become president of Blaw-Knox Co. Nov. 1.

OWEN R. RICE
. . . V. P. and manager, Freyn Eng.

H. Albert Ford was elected vice presi-

ROUND AND SHAPED TUBING
(.010" to ⅝" O.D. Max. Certain Analyses .035" max. wall to 1⅜" O.D.) Available in:
Carbon Steels:
A.I.S.I.—C-1008, MT-1010, MT-1015, C-1118, MT-1020, C-1025, C-1035, E-1095
Alloy Steels:
A.I.S.I.—4130, 4132, 4140, 4150, 8630, E-52100
Stainless Steels:
A.I.S.I.—303, 304, 305, 309, 310, 316, 317, 321, 347, 403, 410, 420, 430, 446, T-5
Nickel Alloys:
Nickel, "D Nickel"*, "L Nickel"*, "Monel"*, "K Monel"*, "Inconel"*, 30% Cupro Nickel, 18% Nickel Silver.
Beryllium Copper.
*Reg. U. S. Trademark International Nickel Company

The HOLE Story —by— Superior

Chapter 1

Shaping a Heart for a Pressure Gauge Requires "Technology in Tubing"

Soon after the tube pictured above comes off the shaping roll, it will be processed into a Bourdon tube, the heart of a pressure gauge, by one of our customers.

The design of a gauge movement and the skill of the gauge builder have a bearing on its accuracy. But nothing can compensate for an irregularly responding Bourdon tube.

That's where Superior comes in. The metallurgy of the tube, its dimensional precision and physical characteristics are all critical . . . and all are rigidly controlled at Superior.

This rigid control is applied to all tubing produced by Superior.

For example, in the production of seamless steel tubing for hydraulic applications, industry standards permit a carbon range of .08 to .18%. This range is not good enough for Superior. Aiming for a carbon content of .12%, Superior Hydraulic Quality tubing is always held to .15% maximum. This insistence on adherence to strict standards applies equally to dimensional tolerances.

Superior produces tubing to rigid specifications year in and year out. We have the engineers, metallurgists, research, production and test facilities that it takes to draw the highest quality small tubing in the widest variety of analyses.

You can call this combination of facilities, men, methods and machines "know-how" . . . or you can call it experience. But whatever you call it the result is always fine small tubing to do a better job for you.

SUPERIOR TUBE COMPANY, 2005 Germantown Avenue, Norristown, Pa.

West Coast: Pacific Tube Company, 5710 Smithway St., Los Angeles 22, Calif. UNderhill 0-1331.

Superior

THE BIG NAME IN SMALL TUBING

All analyses .010" to ⅝" O.D.
Certain analyses (.035" max. wall)
Up to 1⅜" O.D.

DANIEL L. WERTZ
. . . Dow Furnace V. P. sales

J. O. CAVANAGH
. . . joins Alloy Rods as tech. director

WILLIAM O. HALL
. . . Norgren chief project & test engineer

dent and sales manager of **Geneva Metal Wheel Co.**, Geneva, O.

Daniel L. Wertz was appointed vice president in charge of sales, **Dow Furnace Co.**, Detroit. He joined Dow in 1948 as sales representative for the Midwest after many years of service in sales and engineering with Bendix Aviation Corp.

Elections at **Twin Disc Clutch Co.**, Racine, Wis., include: **G. L. Shuman**, vice president-finance and secretary; **R. G. DeLong**, vice president, hydraulic division; **R. T. Howell**, treasurer-assistant secretary; **R. T. Rehwald**, assistant secretary-comptroller, hydraulic division; and **W. F. Shurts**, director of engineering.

James F. Thomas was named plant manager of the new Duncansville, Pa., sheet metal fabrication plant of **National Radiator Co.**, Johnstown, Pa. He joined the company in 1939. He had previously been president of Century Specialty Co. When that company merged into National Radiator as its Century plant, Mr. Thomas became plant manager. He continued in that position until the Century plant was destroyed by fire the first of this month.

J. O. Cavanagh joined **Alloy Rods Co.**, York, Pa., as technical director. He is a veteran of 15 years in the research and development of arc welding electrodes.

R. F. Schutz was named assistant treasurer of **Ingersoll Products Division**, Borg-Warner Corp., Chicago.

Charles L. Way was appointed contract administrator, Long Beach, Calif., division of **Douglas Aircraft Co. Inc.**

Personnel changes at **Harnischfeger Corp.**, Milwaukee, include **C. R. Morris**, who started with the company in 1918 as sales training director, named district manager, Milwaukee territory to replace **F. J. Hirner**, transferred to Philadelphia. **C. O. Barnes**, welding sales supervisor at Pittsburgh, was named sales manager of the hoist division succeeding **E. W. Potratz**, now assistant to the general manager, West Coast plant. **A. T. Mortrud** replaces Mr. Barnes at Pittsburgh. **G. W. Hoskins** was named sales manager, large excavator division, succeeding **P. H. Hunter**, appointed to the San Francisco territory. Mr. Hoskins was district manager at Philadelphia.

William O. Hall was appointed chief project and test engineer for **C. A. Norgren Co.**, Denver. **James A. Moody** was named material control manager.

Raymond S. Perry was elected vice president and director of **Federal Telephone & Radio Corp.**, Clifton, N. J., manufacturing associate of IT&T. He has been general sales manager of Federal's sales and commercial activities since 1949.

Russell P. Sherrill joined **Bridgeport Chain & Mfg. Co.** as New England district sales manager. Bridgeport Chain & Mfg., Bridgeport, Conn., is one of the Round Chain Companies.

Claude N. Monson was named manager of **AiResearch Mfg. Co.**, Los Angeles, subsidiary of Garrett Corp., of which he is treasurer. He formerly was vice president and general manager, Northrop Aircraft Inc.

William R. Chandler was appointed sales engineer in the Cleveland territory for Reliance Division, **Eaton Mfg. Co.**

John J. Peterson was appointed eastern division manager of **Trailmobile Inc.**, Cincinnati. He will have headquarters in New York.

OBITUARIES...

Wayne G. Kenworthy, 43, safety engineer and personnel manager, **Pacific Car & Foundry Co.**, Renton, Wash., died Oct. 10 in Chicago while at the National Safety Congress convention.

Janus Deelman, 48, manager of the purchasing department, **Massey-Harris Co. Ltd.**, Toronto, died Oct. 9.

Benjamin C. Bugbee, 72, owner of a Milwaukee consulting engineer firm, and treasurer and secretary of **General Malleable Co.**, died Oct. 7.

William La Bombard, 80, former partner in **La Bombard & Patterson Mfg. Co.**, Niagara Falls, Ont., Canada, died Oct. 7. In recent years he was expediter for K. R. Wilson Tool Mfg. Co., Arcade, N. Y.

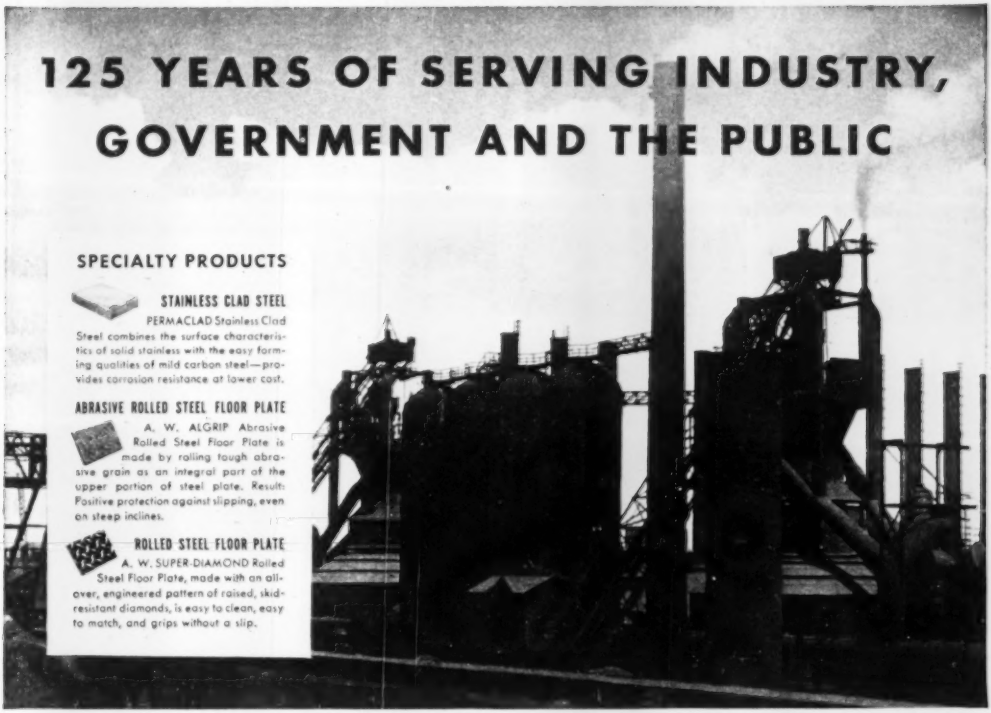
George G. Porter, 71, one of the three founders of **Porter-Cable Co.**, Syracuse, N. Y., died Oct. 6 in Miami, Fla.

Sylvio C. Leoni, managing director of two subsidiaries of **Driver-Harris Co.**, one in France, one in Italy, died in Milan, Italy, Sept. 30.

George G. Sherwood, 60, vice president, secretary and director, **Kaiser Steel Corp.**, Oakland, Calif., died Sept. 15. He joined Kaiser in 1919, and rose from bookkeeper to financing officer for all Kaiser enterprises.

Edwin G. Booz, 64, founder of the management consulting firm of **Booz, Allen & Hamilton**, Chicago, died Oct. 14 in Evanston, Ill.

125 YEARS OF SERVING INDUSTRY, GOVERNMENT AND THE PUBLIC



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PERMACLAD Stainless Clad Steel combines the surface characteristics of solid stainless with the easy forming qualities of mild carbon steel—provides corrosion resistance at lower cost.

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A. W. ALGRIP Abrasive Rolled Steel Floor Plate is made by rolling tough abrasive grain as an integral part of the upper portion of steel plate. Result: Positive protection against slipping, even on steep inclines.

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Special qualities in carbon, copper, or alloy analyses
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Production and Engineering
NEWS AT A GLANCE

FOCUS ON MACHINING—Two excerpts are presented in this issue from the second Air Force machinability report recently released by Curtiss-Wright Corp. One explains how Dodge effected startling economies in the machining of cluster gear blanks for transmissions by a combination of cycle annealing of forgings, carbide tooling and new automatic lathes. The other reviews findings of a dozen organizations investigating the machining of titanium and its alloys. In one of the milling tests, improvement of cutter life was effected by submerging the titanium test piece in a bath of dry ice and tri-ethyl-phophate which brought its temperature down to −100° F. Copies of the 196-page book, given over in the main to summaries of machining tests on commonly used steels, are obtainable from Wright Aeronautical Corp., Wood Ridge, N. J. —pp. 73-77

FROM THE ROCK FOUNDRY— Casting of basalt and diabase rock has been taken up on a commercial scale in Poland and Czechoslovakia. Rock is melted in furnaces at about 2700 °F and poured into molds of sand or iron. Cooling time is usually 24 hours, but will depend upon the size of the cast. The rock castings are reported as "in no way inferior to iron castings" (Foundryman, lay that pistol down!). One advantage of course is that they are electrically nonconductive and resistant to corrosion. Chief products are drain pipes, water pipes, tubs, fittings and other pipeline accessories for the chemical industries. Slabs for machinery baseplates also are being rock-cast, with basalt quarry waste the raw material.

READING THE FINE PRINT—A lathe manufacturer has released two new catalogs illustrating its entire line of precision lathes, drill presses, shapers, attachments and accessories. The publications measure 2½x1⅝ inches in size, have 28 accordion-folded pages of illustrations and type and come without magnifying glasses. Developed for the purpose of enclosing with each item packed for shipment, no matter how small, the miniatures are much in demand as novelties. If you want to test your eyes, drop a line to South Bend Lathe Works, South Bend 22, Ind., and ask for cataloglets 5104 and 5119.

FACSIMILE WITH HEAT—Dry-process machine for making exact and permanent copies of original letters, forms, memos, invoices, charts, sketches or any other material which has been printed or written is now on the market under the tradename Thermo-Fax. As the name suggests it is a facsimile process involving heat. The unit uses a controlled beam of heat to copy black and white originals directly. An infrared light source sends rays through a heat-sensitive sheet to the original. Black ink on the original converts the rays into heat which acts on the sensitized sheet to reproduce the original. No preliminary or finishing operations; no negatives, chemicals, washing or drying; no fading of copies; entire operation in just 15 seconds. Write Magna-Crest Corp., 730 Fifth Ave., New York 19, for more information.

BUG IN A PIPE— To speed up "double-ending" operations on 30-foot pipe sections going into the 1600-mile natural gas line from Texas to northern California, contractors are using an electric "bug". Two of the 34-inch diameter pipe sections are placed on rails, the bug creeps down the inside under its own power to the joint where it forms a bridge and expands to bring the two pieces in line with an exact 3/32-inch spacing. Manual welders lay the first bead in the joint, the bug contracts and reverses its tracks out of the pipe to permit hydraulic lifts to position the section for another manual weld. A third machine weld finishes the joint and the double-ended piece is ready for trucking to the job site.

ENAMEL TO STOP CORROSION—Black steel pipe used for degassing of molten aluminum alloy by chlorination takes a severe beating through washing action of the alloy and action of the gas at elevated temperatures. Average life of one of these pipes has been something like 7-8 minutes. An enameling company went to work on the problem and after trying a wide assortment of cleaning, coating, firing procedures perfected a technique which extended tube life to around 3 hours. Further improvements appear likely but must take cognizance of the cost of coating. —p. 70

SOOTHES LOCKED-IN STRESS—Cracks developing in cone-shaped stampings of low-carbon steel after lengthy storage were traced to locked-in residual stresses of sufficient magnitude to cause longitudinal splitting. The corrective was a stress relief heat treatment at 950° F for an hour, followed by slow cooling. This did not affect mechanical properties and resulted in no distortion. —p. 88

FAST REBUILD JOB—Modernization and mechanization of a merchant bar and small structural rolling mill on the West Coast was accomplished in the amazing time of three weeks. Prefabrication, preassembly, testing and match-marking in the field in advance of the actual changeover proved to be a major timesaver. —p. 82

—A.H.A.

Metalworking Outlook—p. 33 Market Outlook—p. 127

IMPROVED ENAMELS

Extend Life of Steel Chlorination Pipe

Slip compositions and firing techniques modified to ease corrosion problem in black pipe used for fluxing and degassing aluminum alloys. Average life of 10 minutes is multiplied 15 to 25 times, within cost limits

By L. E. DUBE,
Superintendent of Casting Division
Reynolds Metals Co., Brookfield, Ill.
and
NORMAN STROMDAHL
Sales Engineer
Barrows Porcelain Enamel Co., Cincinnati

EVER since Hall and Heroult hit upon a feasible means of producing metallic aluminum, making possible commercial production, the deterioration of various pieces of equipment made from iron or steel and used in handling the molten metal has been a costly problem. In spite of the myriad methods which have been developed and which are used to varying extents and with varying degrees of success for protecting iron and steel equipment against attack, the problem, and its cost, are nearly as great today as ever.

The difficulty is at its most expensive peak when black steel pipe is used for fluxing and degassing molten aluminum alloy with chlorine gas. The degassing tube is not only subjected to the hunger of the alloy for iron and to a certain amount of erosion or "washing" action, but it is literally consumed by combustion supported by chlorine gas at elevated temperature. Possibly 10 minutes is maximum life, with 7 to 8 minutes an average.

Assuming chlorination of 1000 pounds of alloy for 10 to 15 minutes with an unprotected 6-foot length of 1-inch ID black steel pipe, the cost of the pipe alone will range from $.75 to $1.50 plus all costs of handling, cutting, threading, storage and disposal.

Steel the Economical Material—Two ways to avoid the problem are: First, by not using chlorine gas; and second, by using materials for tools other than black steel pipe. In many cases it is possible to flux and degas with agents other than chlorine gas. However, it it also generally conceded that chlorine does the best job and is almost a "must" when alloys must meet rigid specifications. Other materials for chlorinating tubes are carbon, graphite, ceramic, quartz and gray cast iron, all of which resist attack better than uncoated steel pipe. To varying degrees, the first four all cost more than black steel pipe. They are uniformly susceptible to mechanical shock, particularly if any type of coupling or elbow is involved. Thermal shock is also a factor. Gray cast iron, while embodying particularly good resistance to attack, especially if allowed to age and oxidize, is too heavy and unwieldy for many applications.

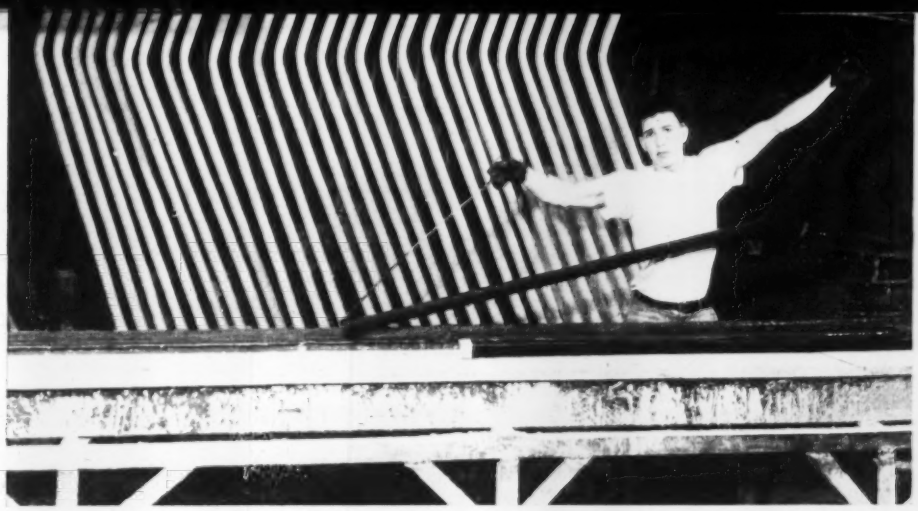
About three years ago Reynolds Metals' Listerhill, Ala., plant, approached Barrows Porcelain Enamel with the request that an attempt be made to develop and apply a protective ceramic which would lengthen the life of black steel chlorination tubes. The action was motivated not only by the disproportionate cost of the chlorinating operation but also by the difficulty of buying pipe in sufficient quantity.

Porcelain enameling normally involves the following procedure: Parts to be coated are fabricated from special steel with an analysis favorable to good porcelain enameling practice. These parts then are cleaned, usually by an eight-stage pickling process consisting of a medium alkali wash, a mild alkali wash, a clear water rinse, an acid etch, a clear water rinse, a nickel flash (to improve bonding qualities), a neutralizing bath and a high-speed dry. Dirty and scaly metal is sometimes sandblasted, a considerably more expensive operation than pickling.

Liquid enamel, called "slip," is basically composed of clay, glass and oxides, plus other additions which determine special character. This in fine powder form is suspended in water and then sprayed, dipped or slushed on the metal. Moisture is removed from the applied coating in a drying oven, after which the dry coating is called "bisque." Ware is then introduced into a furnace, where it is subjected to temperatures ranging from 1300° F to 1900° F, depending on the base metal, the coating, and the result desired.

General practice is to apply an initial or ground coat and fire it. This supplies the bond between the metal and one or several finish coats, each applied by the foregoing method.

Savings Are Proved—Because of black steel pipe's analysis not being conducive to good enameling practice and its arriving from the mill lacquered and badly scaled, various other types of iron and steel tubing were coated and field tested with the hope that even though their cost was higher they would take a much better coating, thus justifying the extra expense by virtue of longer life. None of these materials justified its use, so it was decided that black steel pipe



Formed sections of black steel pipe are coated with liquid enamel "slip" by immersion in a vat, with inside surfaces covered by closing one end, filling the pipe with slip and then draining slowly. Rack of tubes in the background is ready for firing

should be the standard base material. At this time of initial testing, the maximum life achieved with any enamel coating on any base material was about 50 minutes—five to seven times normal uncoated life and most encouraging, since the cost of the coated tubes was only about four times the cost of plain pipe.

Barrows, however, felt that considerable further progress was possible. The next problem appeared to be that of better metal cleaning. According to all theory and most practice, sandblasting should give the most desirable working surface—enough better so that the appreciably greater cost would be warranted by proportionately better performance. Although thousands of lengths of pipe have been processed and used, delivering good average life, since the inception of this technique, the superiority of sandblasting over pickling is still a moot point. The finished sandblasted pipe costs more and there is yet no conclusive proof that it performs much better. In the field, evaluation of the relative merits of the two methods of cleaning is difficult because of qualifying factors which are beyond the control of the testing plant. The material is, of course, subject to possible damage in transit as well as in-plant handling damage.

Inside Coverage Was Problem—Coating the outsides of the tubes presented no problem but getting the inside completely covered was somewhat more difficult. In the specific case of chlorination tubes it had been pretty definitely ascertained that the most severe and rapid attack worked from the inside out in the portion of the tube below the flux level. Work was being done with 14-foot lengths of $1\frac{1}{4}$-inch ID pipe at this time, each of which had an approximate 45-degree bend about 24 inches up from the exhaust end. Pouring or pumping the slip through the tube proved to be too fast. The slip washed itself off. Slushing in a tank was likely to allow an air bubble in the center of the pipe, resulting in no coating at all.

Since thorough inspection of a straight length of pipe is difficult almost to the point of impossibility, inspection of a bent length is absolutely impossible. This meant that any method of coating the inside must be so thorough that the possibility of any uncoated surface was remote. The method now used is to close one end of the tube, fill it with slip and let it drain slowly. Subsequent performance in the field plus spot checking by cutting open at random indicate that this method achieves excellent coverage, limited, of course, by the analysis of the steel.

Supporting various lengths and shapes during the firing process so as not to leave burning tool marks which expose bare metal to attack also presented problems, solutions to which were worked out satisfactorily by evolution.

Pilot runs at this stage began delivering a consistent average life per tube of 120 minutes, a 12 to 20-fold increase over the 7 to 10 minute life of uncoated pipe. This alone was a significant reduction of the cost of chlorination plus making additional savings possible on handling, storage and disposal of pipe.

Average Life Is the Gage—In all fairness, it must be said that these tubes were not a cure-all. Certain chlorination installations, of a fixed nature, when the tube is not handled or subjected to other mechanical shock, possibly can be operated at a lower cost using material other than ceramic coated black steel pipe. By the same token, one magnesium foundry was breaking nonmetallic tubes to such an extent that full, usable life was never realized. The use of ceramic coated steel tubes, even though their potential life was not as long as that of the nonmetallic tube, resulted in a net savings because it was possible to get maximum use out of them.

Thus, 120 minutes became accepted average life. Because of aforementioned limiting factors beyond control, such as difficulty in cleaning, improper metal analysis, difficulty of application, impossibility of inspection and the possibility of damage to the finished

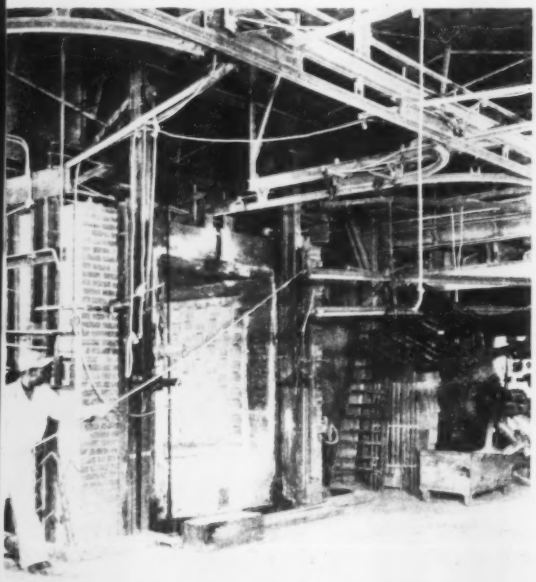
product, individual lengths perform erratically. Hence the emphasis on average performance.

There seems to be no reasonable doubt that a better product delivering longer life can be produced—at a greater manufacturing cost and consequent higher price to the users. Because of the relatively rough treatment these tubes receive, however, it is debatable whether increased potential life can be realized to warrant the higher price.

Further Progress Possible—Within the last year extensive laboratory and field tests have been conducted and are still going on to evaluate a number of new coatings, designed to resist both corrosion and heat. The enamel coating previously described is a two-coat application designed primarily to resist corrosion.

This coating is fired at 1550° to 1600° F, which temperature permits it to flow and fuse completely. Chlorination tubes are immersed in a bath ranging from 1250° to 1350° F over which the surface temperature could possibly reach 2000° F. Apparently the flow of the chlorine gas through the tube over the bath keeps the tube cool enough to prevent the ceramic coating from becoming plastic, but it is certain that the ceramic coating immersed under the flux line does become plastic at 1250° to 1350° F, allowing deterioration to proceed more rapidly and reducing life.

The next step seemed, therefore, to be experimentation with various coatings which would resist becoming plastic at these 1250° F to 1350° F temperatures and thus afford longer protection. Regular so-called high-temperature resistant enamels as such had been tried early in the program without success. They undoubtedly could withstand the temperatures involved, but their resistance to abrasion and alloy "washing" was poor. In addition their fusing temperatures are so high that they are beyond the firing ranges of commercial enameling production equipment generally encountered.



Here a rack of 16 tubes is being guided out of a gas-heated furnace onto overhead monorail after firing for 10 minutes at 1550 °F. They will be given a second application of a different type slip, then returned to the furnace for a second firing

The approach had two objectives: To combine with the successful corrosion resistant coating various refractory materials to "beef up" its resistance to high temperature; or to try to alter the character of some heat resistant finish so that its corrosion resistance would be improved and its firing range would be lowered.

Four finishes of the latter type were milled and applied to four groups of three lengths each of 1-inch ID standard black steel pipe 7-feet long bent 45 degrees about 2 feet up from the exhaust end. Each of these was tested in actual production work. By groups, their average lives were 402, 253, 127, and 170 minutes, respectively.

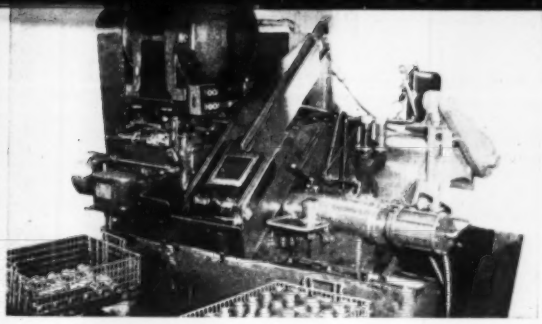
Obviously, Nos. 1 and 2 were by far the best performers so it was decided to test further variations of these two, both of which were basically the same. The improvement over 120 minutes average life, which had been standard, was startling, even sensational. A conservative attitude was indicated, because both groups 1 and 2 had been extremely well covered, whereas past experience indicated a quality coating on the base material could not always be anticipated with them. Besides, in using large quantities of tubes, in-plant handling damage would always limit performance.

In the next series of tests four variations of the heat resistant coatings just discussed were prepared and two variations of the original corrosion resistant finish with an addition to make it more refractory. Coatings were applied to 20 lengths with each finish. The results:

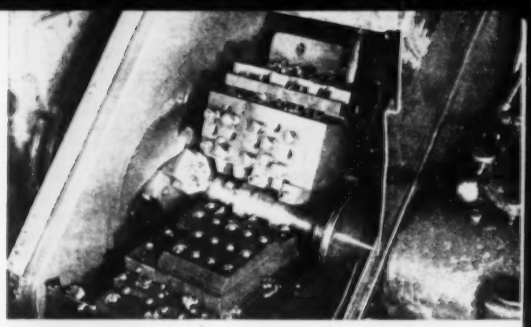
Group No.	Av. life, min.	
8	120	Variations of original coating
11	148	
12	160	
13	224	Variations of heat resistant coatings
14	128	
15	96	

Coating Cost Is Important—The conclusion drawn from these results was that improvement of both finishes was possible. Superficially there would seem to be no question about which finish to use—group 13, of course. But the decision was not that simple. Group 13 entailed the use of more expensive base enamel materials which were originally intended for use as a one-coat application. In order to get the No. 13 finish it was necessary to sandblast, coat and fire twice, or pickle, coat and fire three times. This altered the cost figure appreciably. All of the heat-resisting groups were more expensive to apply. In spite of this extra cost, some of them were not good performers.

From the standpoint of (*Please turn to Page 99*)



Automatic lathe specially designed for carbide tooling to machine 190 transmission cluster gears an hour



Loading and unloading time is held to 13 seconds, with assistance of a self-retracting coolant hood

Carbide-Tooled Automatics Double Gear Blank Output

TWO new 75-hp lathes have replaced four old machines and are producing 190 automatic transmission gear blanks per hour at Dodge Division of Chrysler Corp., Detroit. Recognizing that economical metal removal is desirable in the production shop and that cost reduction depends heavily on increasing the rate of metal removal, the company is replacing older machines as soon as gains can be demonstrated.

This case history is typical of the industry-wide improvements in machining brought about by an increasing awareness of the advantages of high-speed, high-power machines, carbide-tooled, and close control of microstructure through cycle annealing.

The two new 16 x 21-inch automatic lathes were specially designed for the job in co-operation with the tool builder. They were tested and run off at the builder's plant, but several minor problems had to be solved after the machines were put into production.

Kennametal K3H, Wesson WM, or their equivalents, were found satisfactory tool materials. The only tool which gave trouble at first was slotting tool No. 7 (see illustration). The problem was solved by tapering it 2 degrees on each side which gave it a shaving action and eliminated the breakage. Fortunately, the tapered groove was not objectionable.

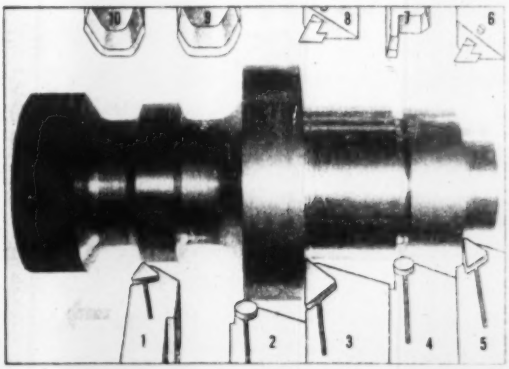
The countershaft gear blank is forged of AISI 4032, hot-rolled, 1 13/16-inch diameter bar stock on 5-inch header, starting at 2050° F and finishing at 1825-1890° F. The air-cooled forgings are cycle annealed in a continuous gas-fired furnace in the following manner: Heat to 1725° F in 1¾ hour; hold at 1725-1750° F for 2¾ hours; drop to 1650° F for 30 minutes; cool by air blast to 1300° F in 5 minutes; still air cool to 900° F; total time 4½ hours. This treatment produces a continuously uniform microstructure of 75 per cent ferrite-25 per cent pearlite of 16-196 brinell.

(The above and accompanying data, together with illustrations, are from the second Air Force machinability report, published by Curtiss-Wright Corp., Wood Ridge, N. J., and concerned primarily with machining data on a wide variety of commonly used steels. Refer also to article beginning on next page.)

COMPARISON OF MACHINING METHODS

	OLD WAY	NEW WAY
Production rate, pcs. per hour per machine	42	95
Surface finish, microinches, rms	300	150
Tool life, pcs. per grind	...	100
Cutting time, secs. per pc.	75	25
Floor to floor, secs.	86	38
Structure, AISI 4032	...	75% ferrite 25% pearlite
Cutting speed range, (fpm)	48-102	225-480
Feeds, side, arm (inches per rev.)	0.012-0.009	0.014-0.011
Spindle rpm	106	500
Coolant	both soluble oil, 30:1	
Power, peak load, kw	...	37
Tools	high-speed	carbide

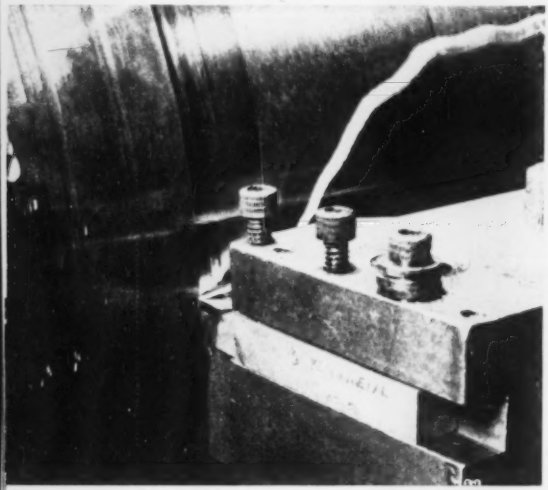
Cutting speeds range from 225 to 480 fpm at 500 spindle rpm. Feeds are 0.014-inch per revolution in front, 0.011-inch in rear (top)



Photomacrograph of gear blank forging showing uniform flow lines. Microstructure reveals 75 per cent blocky ferrite and 25 per cent fine pearlite in the AISI 4032 steel

CONCLUDING section of the second monumental Air Force machinability report just published by Curtiss-Wright Corp. deals with machining of titanium alloys. Companies supplying information which is largely of a preliminary nature include: Campbell Machine Division of American Chain & Cable Co.; Douglas Aircraft Co., General Electric Co., Lockheed Aircraft Corp., P. R. Mallory & Co. Inc., Metcut Research Associates, New York University, North American Aviation Inc., Pratt & Whitney Aircraft Division, Rem-Cru Titanium Inc., Titanium Metals Corp., Westinghouse Electric Corp., Wright Aeronautical Corp. and Wyman-Gordon Co. The report itself, in the form of a 196-page book, is devoted principally to the machining of a wide variety of commonly used steels. Future reports are planned on the research program which was initiated in 1948, with additional work on the machining of high-temperature alloys and titanium already under way. Research has been broadened to include grinding.

Titanium



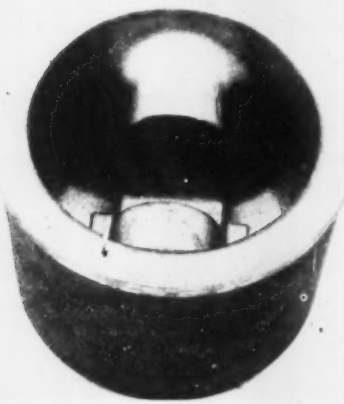
Above—Cleaning up the cast titanium ingot prior to forging is one of the toughest jobs. Note the non-curling chip, typical of titanium alloys

PURE titanium is comparatively soft and weak, as well as being extremely difficult to refine. Commercially-pure titanium contains enough impurities to alloy the material considerably with an attendant improvement in mechanical properties. Metallurgists have been trying various alloy combinations to develop high-strength materials. The ones currently in use contain chromium and iron, or chromium and aluminum, manganese and aluminum, or manganese alone.

Titanium's properties are of tremendous importance to the aircraft industry (high strength, light weight, high endurance limit, corrosion and heat resistance), and most of its experimental applications are in this field. Among the metal extensively used in the aircraft industry, the austenitic stainless steels come the closest to titanium in giving an approximate concept of how the new material machines.

Reports from several of the aircraft builders give

Experimental piston of titanium alloy has been forged and heat treated (left), then machined, stress relieved and given service test (right). Alloy at room temperature shows 150,000 psi ultimate tensile



Discouraging results in certain machining operations only point up need for more complete knowledge of proper tool materials, design, feeds and speeds to overcome early tool breakage and metal pickup

Machines Like Jet-Engine Alloys

this impression. Tests show that titanium is considerably more difficult to machine than stainless steel, and that it would better be classified in the range with the less familiar high-temperature jet-engine alloys. In fact, comparing titanium with stainless steel is justifiable only in that both alloys are highly work-hardenable and cut with a tough, stringy chip. To this extent, the comparison serves as a starting point for new users of titanium alloys.

Billet Surfaces Poor—One of the important processing operations on titanium is the lathe cleanup of billets prior to all forging and rolling operations. The surface condition of these billets is poor because of casting pits, slag inclusions, hard particles, and contaminated alloy. These surface defects must be removed before billets are processed to avoid distributing the contamination throughout the finished product and to prevent damage to forging and rolling tools.

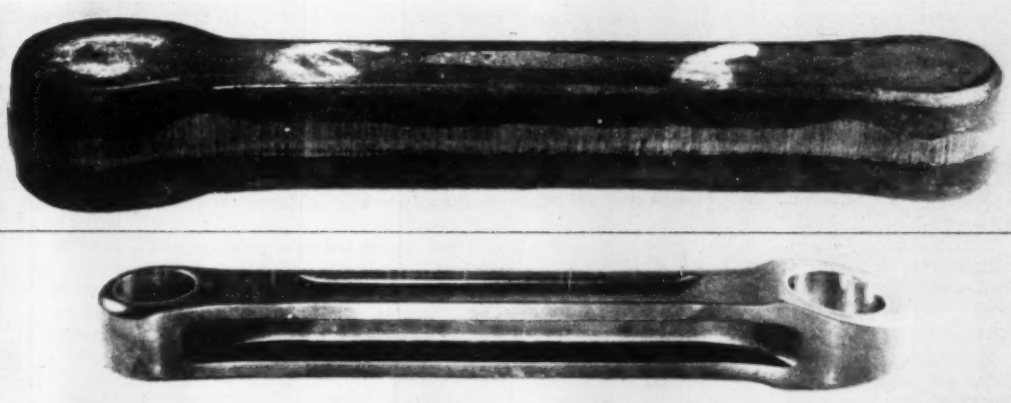
Some improvement to the surface can be effected by sand or shot blasting, and by etching as much as 0.008 to 0.012-inch if necessary. Some of the worst defects are removed by scarfing or snagging.

Other machining operations, although basically similar to turning, are vastly more complicated. Comparative test findings on milling, drilling and all the others immediately introduce an array of additional variables. Factors such as cutter diameter, number of teeth or flutes and helix angle, to mention a few, make the analysis more difficult. Comparative information may be misleading, therefore, unless tests are conducted under identical conditions with all variables controlled.

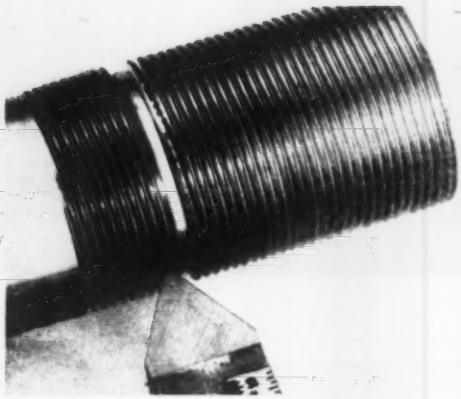
Data Not Conclusive—The presently available data on milling and drilling are all of a preliminary trial nature to uncover the best course to follow in more detailed test work. A few isolated findings are given. In general, it can be said that titanium alloys can be machined fairly satisfactorily at speeds in the vicinity of 70 fpm.

One company's experiments in milling are interesting. It was found that 18-4-2 high-speed steels are about the best of the steel tool materials and cast alloy cobalt-chromium tools superior to carbides. One trouble in carbide milling is that carbide sections tend to flake off due to combined effects of intermittent cutting and the welding of chips to the tool face. Axial-flow compressor blades are being made from Ti-150A as a possible substitute for AISI 410 stainless steel. Data on this operation are presented in the following summary:

With Tantung side and end mills operating at about 90 fpm (4-inch diameter, 75 rpm), tool life is about 150 pieces per cutter grind. With Vasco Supreme (18-4-1) high-speed steel end mills, the ends of 1¼ x 1½-inch bars are milled square to length



Connecting rod, as forged and after machining, is approximately 12 inches long and of an alloy slightly stronger than the piston. Photos of piston and rod courtesy of Wright Aeronautical Corp.



Good threads are chased in a 5 per cent chromium 3 per cent aluminum alloy of titanium using a single-point carbide threading tool

Carbide-tipped end mill, cutting at 46 fpm, with 0.008-inch feed per tooth, cut well for a short time, then broke down rapidly under extreme heat

at about 50 fpm (2¼-inch cutter diameter, 92 rpm) with a ⅛-inch depth of cut and 1 inch per minute table feed. Tool life is about 120 pieces between grinds (about 25 cubic inches metal removal).

Maximum Coolant Needed — Reports on sawing titanium vary from "difficult" to "almost impossible." Band sawing seems to be out; the Motch & Merryweather saw seems to work with fair success; and certain types of hacksaws give promise. Abrasive sawing is the best bet at the moment, however, provided, proper equipment is used.

In abrasive sawing titanium, it is impossible to plunge straight through a large piece. The wheel must cut successive overlapping shallow scallops, keeping the area of wheel contact as small as possible at all times and giving the coolant the maximum access. If possible, the work should be slowly rotated or indexed so the wheel can cut toward the center and never have to cut more than halfway through. Machines having a wheelhead capable of oscillating as well as plunging motion are ideal. Titanium's poor heat conductivity requires the maximum flow of coolant if heat cracking is to be avoided. The tendency to clog wheels also accentuates the importance of minimizing the wheel-work contact area.

A soluble oil type coolant is available that kills the objectionable rubber-wheel odor. Seven-inch diameter titanium bars have been cut, rotating the work and oscillating the wheel, in 10 minutes (about 14.2 seconds per square inch). A 1-inch bar is cut in 4 seconds.

Considerable promise is shown in the abrasive cutting of titanium at lower wheel speeds; 3000-4000 fpm instead of the usual 5000-6000 fpm has been tried with good results and at these speeds wheel wear is reduced appreciably.

With hacksawing, constructive recommendations indicate an extremely coarse saw (two to four teeth per inch), slow speeds and heavy feeds. Ordinary fine-toothed saws and conventional feeds result in extremely small feeds-per-tooth. With titanium, this results in rapid work hardening which makes further cutting extremely difficult.

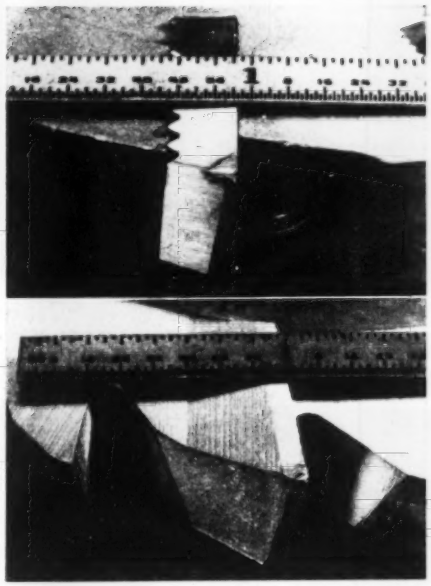
Hold That Feed! — All machining operations on titanium alloys require the observance of this rule: Because of the rapid and extreme work-hardening tendency, do not disengage feed while tool is in moving contact with work. This is particularly true in drilling. For the same reason, pilot holes are "out" and the enlarging of holes is to be avoided. Poor thermal conductivity and a strong pickup or welding tendency are two more properties of titanium which require special techniques, and the tough, noncurling type of chip further complicates the picture in drilling and tapping because of space restrictions.

Eccentric drilling, using high-cobalt drills with notched lips, slow speeds and about double the feed common with steels offers promise of giving improved results. (Next smaller size drill, point ground off center, runs out, drilling a larger hole.) This minimizes rubbing and reduces pickup and heating tendencies.

The notched lip idea in drilling when carried over to tapping results in use of staggered-tooth taps which also tend to break up chips. Use of a 60 per cent thread and a tapping speed of 12-15 fpm are also recommended.

Turning with Carbides—Extensive preliminary tests on the 5 per cent chromium, 3 per cent aluminum alloy have been made by Lockheed Aircraft Corp. Selected data on the development of turning and milling techniques are included here. Turning tests were run with carbides of several makes, cast alloy materials and high-speed steel. Of the carbide tool tests, the information on Kennametal is the most complete but its inclusion is not intended to imply any exclusive preference.

Lockheed's tool-life technique is to cut a predeter-



Side-milling cutters of the carbide inserted-tooth type (upper) and the high-speed steel type (lower) were operated on titanium at 30 fpm. Neither tool was able to cut more than 2 sq in. of machined surface without complete edge breakdown as shown

mined quantity of metal (measured in square inches of machined surface) with each tool under identical conditions, then study the wearland or extent of breakdown. The four initial tests were made using a feed of 0.010-inch per revolution, a depth of cut of 0.030-inch, and 35 fpm cutting speed. Oil was used as a cutting fluid and 55 sq in. of surface were machined.

K3H, a steel-cutting grade; K6, a hard, cast iron grade; K2S, a cast-steel grade, and KM, a general-purpose grade were tried. Both the K6 and K2S tools performed successfully, exhibiting practically no wear for the 55 sq in. cut. K3H showed medium tool wear, considered as excessive; the KM tool wore about the same.

On the strength of these findings, K6 was tried again, this time at 0.020-inch per revolution feed, 0.060-inch depth of cut and 100 fpm cutting speed. The tool was permitted to cut 95 sq in. of surface in which time the tool was observed to have cratered badly.

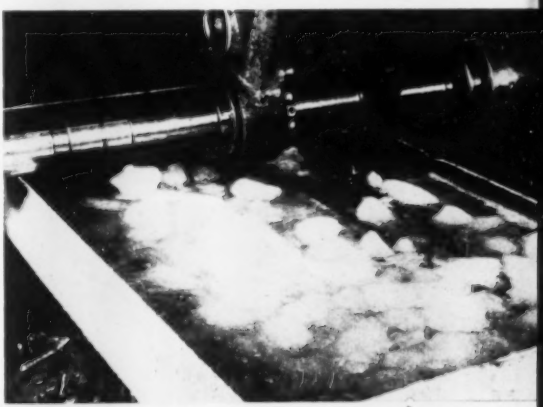
A finishing cut then was made, again using K6 carbide. Feed was set back at 0.010-inch per revolution and depth of cut was made shallow, only 0.0025-inch. Speed, however, was increased slightly to 120 fpm, 140 sq in. of surface was machined. Wear was slight and results were considered satisfactory. Finish in all tests but the heavy feed run was good, about 100 microinches.

Tools Dull Quickly—Milling tests were performed on a Kearney & Trecker No. 2 horizontal milling machine, using both carbide and high-speed steel cutters. Cutting speeds from 20 to 720 fpm and feeds from 0.004 to 0.016-inch per tooth were tried and cutter wear observed closely.

With a 4-inch diameter, four-tooth KM carbide-tipped endmill having 6 degree negative axial rake and approximately 6 degree positive radial rake and a 6½ degree clearance angle, tests were run under various conditions. At 21 fpm, cuts were taken at 0.006 and 0.008-inch feed per tooth using lard oil. In both cases the tool dulled rather quickly. A later test was run with the same cutter on titanium, using no cutting fluid, at 46 fpm and 0.008-inch feed per tooth. In this case, the tool cut well for a short time, followed by extreme heating and rapid breakdown.

High-speed steel side-milling cutters, plain and chromium plated, also were tried, at speeds from 27 to 31 fpm and feeds of 0.004-0.005-inch per tooth with poor results. The chromium-plated tool broke down quickly while the plain cutter having a slightly lower radial rake and less axial rake lasted for 2 sq in. before losing its edge. Two of these cutters are shown in illustrations at the left.

Tests then were performed with a 6-inch diameter, six-tooth Carboloy-tipped side milling cutter having 2½ degree negative radial rake and 6 degree negative axial rake. The titanium test piece was submerged in a bath of dry ice and tri-ethyl-phosphate resulting in a temperature of −100° F. With this setup, speeds from 31 to 60 fpm at feeds of 0.005 to 0.008-inch per tooth produced no tool wear. At 30 fpm and 0.016-inch per tooth, wear was slight. At 89 fpm and 0.013-inch per tooth wear was also slight. (In both cases, the finish was coarse.) Tests were also run at 118, 151 and 195 fpm and feeds of 0.0045, 0.0015 and 0.008-inch per tooth, respectively, and the results were progressively poorer. The setup for cooling is shown directly below.



Submerging the titanium test piece in dry ice and tri-ethyl-phosphate, brought temperature down to −100 F and lessened tool wear somewhat at lower speeds

Research Uncovers Materials for Supersonic Engines, Missiles

By A. H. ALLEN
Associate Editor

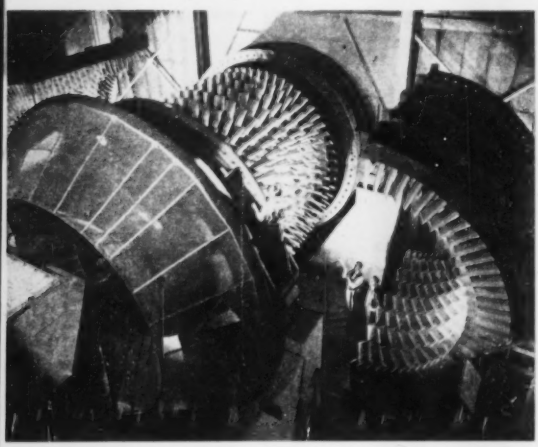
NACA technicians find improved means to cool turbine buckets and disks, indicating a 95 per cent saving in strategic alloy requirements. Time lag compensators, electromagnetic flowmeters, hot gas thermocouples, electronic computers are recent products of advanced studies in flight propulsion

IN THE DRIVE to increase thrust of turbojet and ramjet aircraft engines, the limiting factor has been the ability of metals to withstand high temperatures, specifically in the turbine type unit the buckets and disk of the turbine wheel, nozzle vanes and stator blades. An obvious answer is to devise means to cool these elements, either by air or liquid. Cooling accomplishes the dual effect of permitting higher temperatures in the turbine and at the same time the use of lower alloy material. Now, when there is talk of programming 250,000 engines a year, is the matter of conserving critical alloys particularly important.

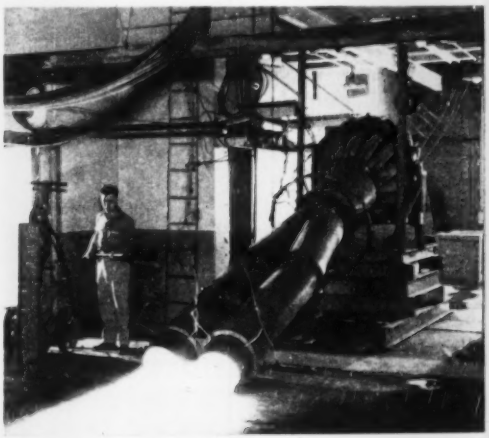
Four years ago the subject of turbine cooling was attacked by the NACA Lewis Flight Propulsion Laboratory in Cleveland. Research experts there were familiar with German work in the field and their first attempt was to use hollow blades or buckets, forcing cooling air through them. This took too much air, which must be bled from the engine's compressor system. Next, metal inserts were brazed into the buckets to constrict the internal passage, and by 1949 the work had progressed toward improved types of internal fins. Investigations of these years were of the static cascade type.

Inner Tubes Brazed—The research then turned in 1950 to the consideration of a series of small tubes brazed to the inner surface of the bucket. These studies have continued and it was found possible to reduce the wall thickness of the blade and increase the number of tubes, to the point where cooling now appears to be a highly practical approach to improvement of efficiency, probably even more so than was indicated to visitors at the recent biennial inspection staged by the Lewis laboratory for several thousand representatives of government, industry and educational institutions.

Essentially what is being done is to bleed a few per cent of the air volume from the compressor, duct it through tubes in the tail cone to the hub of the turbine disk and through a labyrinth seal to passages in the disk, which is split so that air may cool it internally, and then to the individual turbine buckets which are brazed into the wheel in such a way that the air passes through the tubes (0.015-inch wall) brazed to the inside of each bucket. The latter is formed from tubing to the airfoil shape, instead of



This 956-blade, seven-stage, 87,000-hp compressor shoots the breeze to the 8x6-foot supersonic wind tunnel at NACA's Lewis laboratory. Casings are swung back to permit blading inspection



Interaction of twin-jet exhausts inclined toward the ground in simulation of takeoff conditions is under full-scale study here. An operator stands by with carbon dioxide extinguisher

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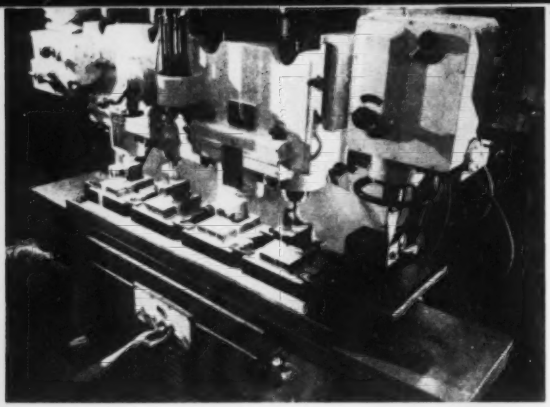


Toolroom techniques are practiced in filling a wide variety of small-lot orders for turbine buckets and compressor blades. Here a craftsman observes a milling operation on a four-spindle duplicator

being forged or cast as are conventional turbine buckets.

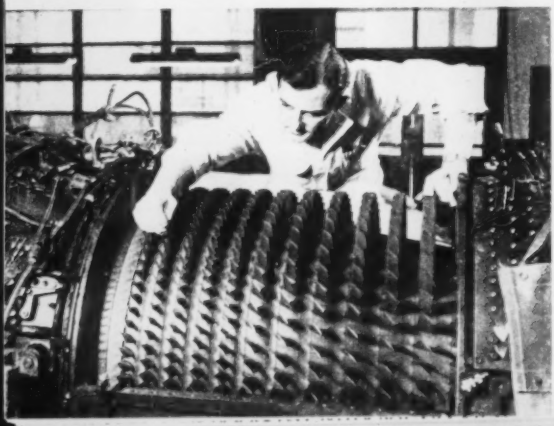
The following tabulation shows the results of actual thermocouple readings on the effect of cooling air on blade temperatures at turbine speed of 8000 rpm:

% of Air Volume Admitted	*Gas Temperature °F*	*Blade temperature °F*
None	1400	1400
1	1400	1100
3	1400	850
5	1400	775

Similar effects have been noted on turbine disk temperatures. For example, where the rim of the disk without cooling registered 1100 °F, with a split disk and air cooling the rim temperature dropped to as low as 550 °F.

The obvious possibilities are greater engine loadings, more power, reliability, and the use of low-alloy steels instead of super-alloys in disks and buckets. In fact, NACA technicians estimate that the cooled disk-blade arrangement would require only 3 per cent of the critical alloying elements—cobalt, chromium and tungsten—against 97 per cent required by the former solid alloy components.

Engineers inspect the various stages of blades in the axial flow compressor section of a J-47 turbojet engine. As much as 5 tons of air a minute is pushed through the compressor to burners and turbine



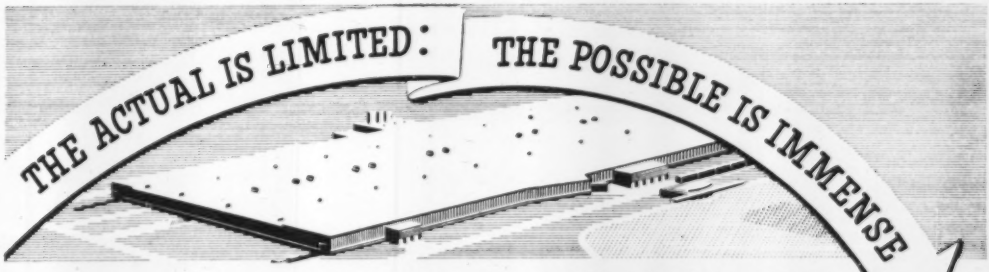
More Thrust with Afterburners—Concentrated research has been directed by the Lewis lab on the development of afterburners for turbojet engines. Supersonic flight, it might be pointed out, has been possible only through the incorporation of afterburners in these engines, since the amount of thrust required to sustain flight jumps sharply as speed passes through the sonic barrier. It might be possible to increase engine size to provide this added thrust, but the attending drag and weight make this impractical. By inserting a burner system in the tail cone and pouring fuel through a proper system of flame spreaders and diffusers the push of the exhaust gases is amplified greatly and the necessary thrust is obtained. However, it brings many problems of integrating controls cooling the shell and fuel nozzles, and the provision of automatically controlled "eyebrows" or dampers at the end of the tailpipe. As these are worked out by the NACA, determinations are compiled into reports distributed to engine builders, thus keeping the work of the laboratory entirely on a research plane, with no actual engine production as such.

However, the NACA shops must fill large numbers of orders for special blade shapes to be tested under all conditions of simulated flight. These orders usually call for 6-100 blades each, made to precision dimensions and tolerances no more than 0.002-inch. Twist, taper and curvature are all variables that must be controlled accurately over the length of a blade, calling for a high degree of toolroom precision.

Blade templates are six times actual blade size. Duplication equipment is of several types, one of the latest being electronic in nature with the blade shape being produced in metal foil attached to paper backing. An electronic tracer controls a milling machine which produces master brass patterns, these being transferred to another duplicating machine with an electronic tracer which shapes the actual blade.

Electronics Improve Instruments—Instrument research at Lewis lab has been productive of a number of unique devices. One is a time lag compensator for use in connection with thermocouple measurements of high temperatures. With this equipment the normal lag in a thermocouple reaching equilibrium is anticipated so that temperature changes may be recorded instantaneously. Another innovation is an electromagnetic flowmeter based on the principle of a conductive liquid flowing through an electromagnetic field. It is used successfully in rocket research and while not yet suitable for measuring flow of hydrocarbons it may become so with the perfection of suitable minor additives.

One of the largest, most active and most secret of the facilities in the $100 million Lewis lab is the materials and stresses division. Here the principal programs are aimed at improving fundamental knowledge of why materials fail. Particular attention is being paid at the moment to the influence of the nature of surfaces on creep failures, specifically the effects of submicroscopic cracks. Studies with single crystals coated with a film of silver suggest that cracks actually may follow a pattern of proceeding along the lines of greatest "atomic population."



NEW LINCOLN PLANT CREATED BY INCENTIVE-INSPIRED CO-ACTION IN DEVELOPING POSSIBILITIES IN PRODUCT

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DESIGN IN STEEL IMPROVES APPEARANCE

. . . lowers cost 15%

UTILIZING the economies of welded steel has cut the cost of this machine base by 15%, while achieving better sales appeal through its clean, modern appearance.

Following the features of the original base, as shown in Figure 1, the first design involved 13 separate components and required 205 inches of welding (Fig. 3). However, by taking full advantage of opportunities for simplifying details while increasing strength and rigidity, the final design, (Fig. 4) involved only 7 components and welding was reduced 40%.

Machining costs are cut sharply since welded components are formed close to finished dimensions. Changes in design for special needs of customers can now be accomplished without need for alterations in patterns.

Fig. 4—Present Design *has rigid box-type construction. Needs less material than Figure 3. Designers and Fabricators: The Ibaker Repair and Welding Shop, Inc., Bridgeport, Connecticut.*

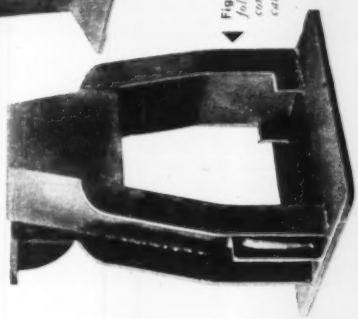

Fig. 3—First Weldesign in Steel *follows appearance of original construction. Saves on metal because steel is stronger than iron.*

WELDED DESIGN ALWAYS IMPROVES PRODUCT AND LOWERS COST

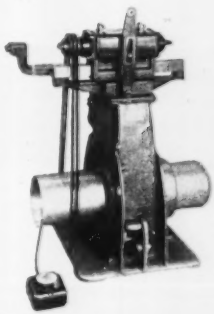

Fig. 1—Original Design *of wire straightening machine for the A. H. Nilson Company, Bridgeport, Connecticut. Required considerable machining, cleaning and finishing prior to painting.*

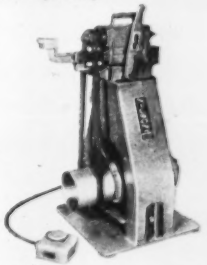

Fig. 2—Welded Design *costs 15% less. Has improved appearance . . . better selling appeal. Tests show base has greater rigidity than in original construction.*

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Machine Design Sheets are available to designers and engineers. Simply write on your letterhead to Dept. 611.

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BAR MILL REBUILT

in Three Weeks

PREFABRICATION and good planning enabled Bethlehem Pacific Coast Steel Corp. to complete modernization and mechanization of a rolling mill without a long shutdown during a period of peak production. Initial planning for this major project was made months ago after market surveys indicated the need for increased production of merchant bars and structurals rolled on the 16—12-inch mill in the company's Los Angeles plant.

Within three weeks after the actual shutdown, the mill received its first billets and resumed production while final adjustments were made and miscellaneous small equipment installed. A new billet-heating furnace, mechanical transfer tables and a new 240-foot cooling bed, all contribute to the expanded range on this mill which now rolls up to 3-inch rounds, 6 x 1-inch flats, 4-inch I-beams, 5-inch channels and 4 x 4 x $^{3}/_{4}$-inch angles.

First unit of the expansion to be completed was a billet-heating furnace of larger capacity and advanced design. This was accomplished without disrupting the old furnace which continued to function until the shutdown.

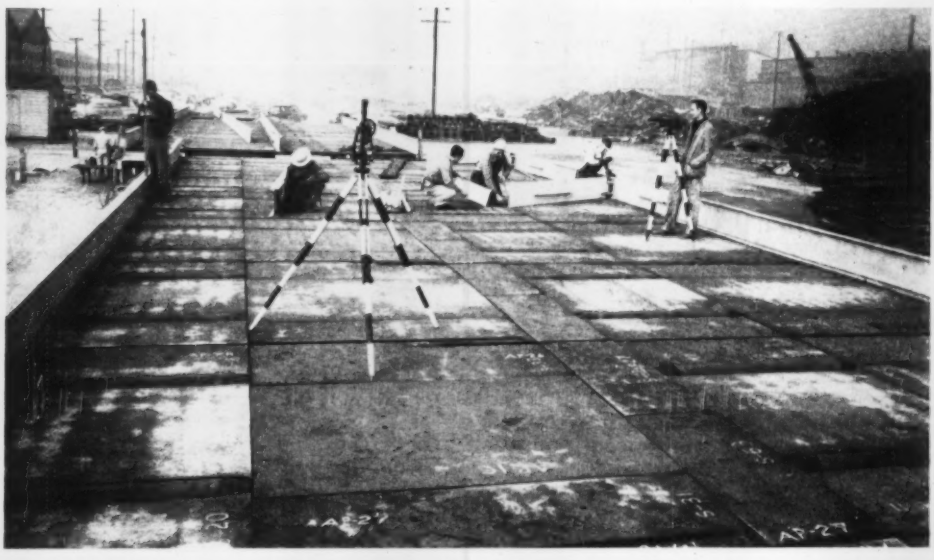
Prefabrication Saves Time—Mechanical transfer system, designed and built by Bethlehem Pacific's S. San Francisco plant, was assembled, mechanically tested and match-marked in the field several weeks before the mill shutdown. The mechanical cooling bed was given a similar treatment at the eastern plant where it was manufactured.

On arrival, the nearly 500 tons of parts were gathered and stored in proper erection sequence, ready for installation. To handle this cataloging, a special group classified as a construction warehouse control unit was set up.

Efficiency of this unit was also reflected in electrical portion of the mill modernization. In order to contribute to the shortening of the downtime, the electrical contractor made extensive use of prefabrication. Approximately 90 per cent of all conduit runs were made up in the field and later placed by overhead crane. Galleries and operating pulpits were also prefabricated and stored against an installation sequence. Delivery timing of electrical components was integrated into the installation schedule so tightly that equipment moved directly into final location immediately on delivery with some vendors using air freight to meet deadlines.

No Waste Motion—Actual shutdown took place on

Mechanical transfer system is preassembled in the field to reduce mill downtime. All parts were match marked and the entire unit test operated before disassembling for later installation on its permanent foundation



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Illustrated is a Morgan 10-Ton High Visibility Floor Charger with hydraulic hoist and box clamp.

By using a hydraulic hoist, the large hoist motor with its reduction unit usually used, is eliminated, thus providing maximum visibility for the operator.

A hydraulically operated head at end of peel clamps the box head so the box will not "flop around" when turned.

Four (4) take-up reels for handling the motor leads are provided, thus eliminating twenty (20) conductor angles on the bridge.

Trolley is carried on four (4) top running wheels with two (2) kick-up wheels. The two rear upper and kick-up wheels are spring suspended for absorbing shocks when picking up loaded boxes.

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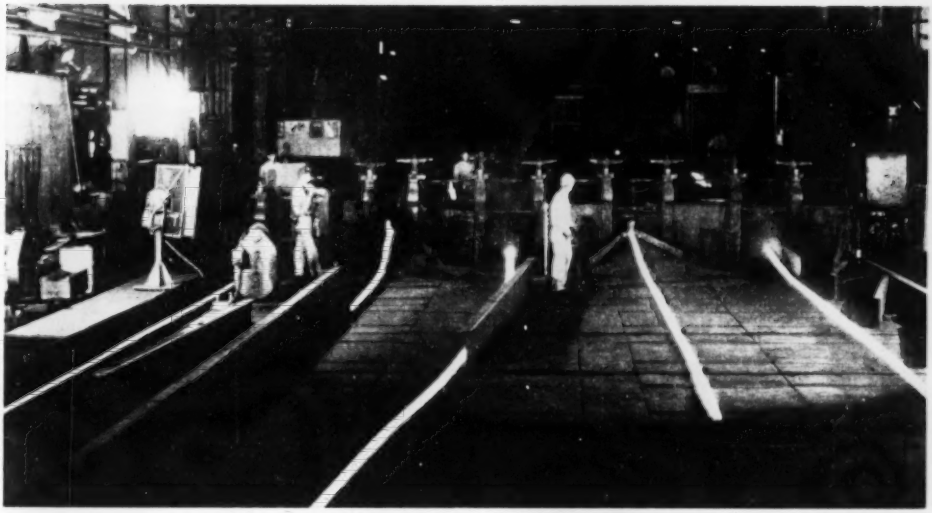


View of the rebuilt 12-inch mill showing five bars rolled simultaneously. Mechanical transfer system being preassembled in other photo is in foreground

the second turn Saturday and by 7 a.m. Sunday several hundred men representing contractors and many trades were swarming over the area. In the first 22 hours about 400 tons of equipment were removed and classified for later sorting into usable or scrap material. Additional tons of earth and old foundations were also removed. In the course of this removal, several "lost" foundations, buried tombstones of mill changes and relocations, long forgotten were uncovered and removed. These discoveries disrupted planned schedules.

At the same time, portions of the new equipment were being placed on foundations that had been installed beneath the old cooling bed while it was still in operation. It became a common sight to see the overhead crane bring in a new section, set it on its foundation and return with some of the old parts to be taken to the classification area by the same trucks that brought the new. This was interspersed with the delivery of concrete for additional foundations being formed up as fast as excavation permitted.

Prefabricated wire ways and conduit were frequently placed and formed over simultaneously. Approximately 25,000 feet of conduit of various sizes was placed in one single 4½-hour period by following this method. In some instances this work was so rapid that wire was being pulled through the conduit as the concrete was being poured.

Busy Place — In the initial 22-hour demolition period, over 2500 man hours were expended in an area 60 feet wide by 500 feet long. In the course of the total project, over a thousand cubic yards of imbedded, reinforced concrete foundations were removed, nearly 2000 cubic yards of new concrete poured and about 1000 tons of machinery installed or relocated.

New billet-heating furnace is of the oil or gas-fired, two-zone type, and has a normal capacity of 60 tons per hour. It is top fired in both primary and secondary zones. Using zone firing, the furnace can be operated efficiently at varying tonnages. Automatic combustion controls maintain the correct temperatures within the furnace and correct fuel/air ratio in each zone. Heated billets are pushed out of the furnace through a side discharge door directly onto a mechanical run-out table which delivers them to the 16-inch roughing mill.

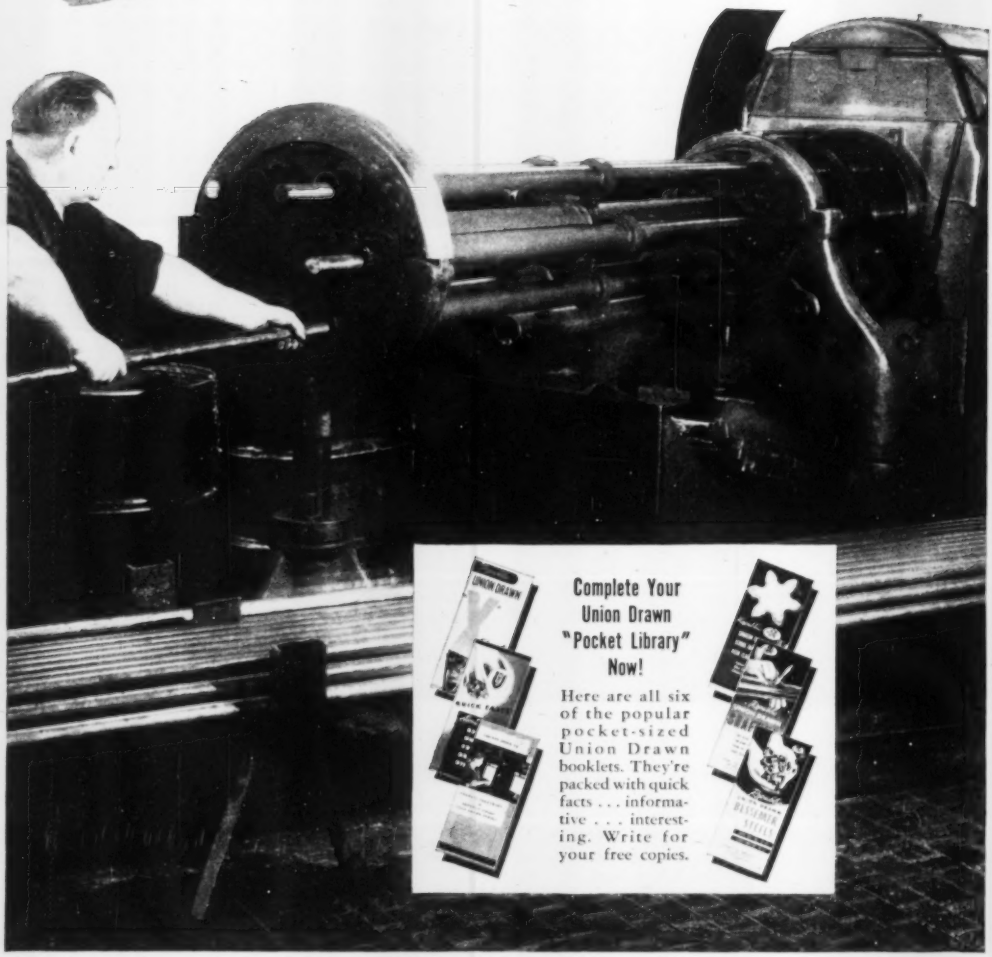
This mill was completely rebuilt and equipped with a new mechanical tilting table to eliminate manual transfer of the billet during its several passes through the mill. This company designed and built transfer mechanism permits the handlings of heavier billets.

Welded Ship Failure Out

After years of studying the steel from those few welded ships that failed in the last war, it seems justified to conclude that the danger of ship failures through "brittle fracture" of the steel will nearly vanish with the proper use of steel made to recently announced specifications, in the opinion of Samuel Epstein, research engineer, Bethlehem Steel Co. Mr. Epstein stated his views in a technical paper before a regional technical meeting of American Iron & Steel Institute in Philadelphia.

He said that ships operating in cold waters were found to be much more susceptible to brittle fracture or sudden snapping of the steel than those operating in warm waters. It was also found that the only condition under which brittle fracture of steel ship plates can occur is that of severe "notching." Recently steels have been developed, to specifications of the American Bureau of Shipping, with a high resistance to this condition. Use of the newly specified series of steels along with improvements in ship design and workmanship, has been successful in providing plates of sufficient notch resistance, which should meet any requirements that may be encountered in ships.

Load Up



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So, load Union Cold Finished Steel Bars. Watch spindles whirl, tools bite deep, cutting oils gush steadily and finished parts thump a tattoo into pans.

That takes MACHINABILITY—the Union Drawn kind that's *uniform* throughout bar after bar and shipment after shipment.

Better and better steel MACHINABILITY has been the 60-year goal at Union Drawn. Today, no one knows more about steel machining than the men who make Union Cold Finished Bars. Year after year, every new bit of knowledge is translated into improved steelmaking and finishing.

Because of such intense concentration on one single goal, today's Union Cold Finished Steels allow you top ratings on feeds and speeds . . . longer tool life with fewer grinds . . . freedom from abrasive elements . . . smooth, bright machined surfaces . . . high production . . . low unit cost.

Need help on any machining or change-over problem? "MACHINABILITY Headquarters" can help you there, too. Union Drawn Field Representatives have prompt solutions to most production problems. They're ready for consultation any time you are. Just write:

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Are your parts and equipment such that you can use higher speeds and longer tool life? Then it will pay you to investigate Union Drawn's extra fast machining Bessemer Screw Steel, B-1113X. Your Union Drawn Field Man will be glad to tell you all about it.

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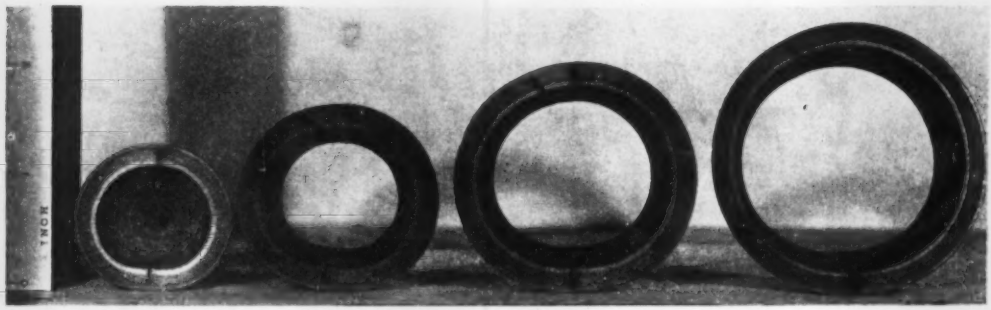
UNION COLD DRAWN STEELS

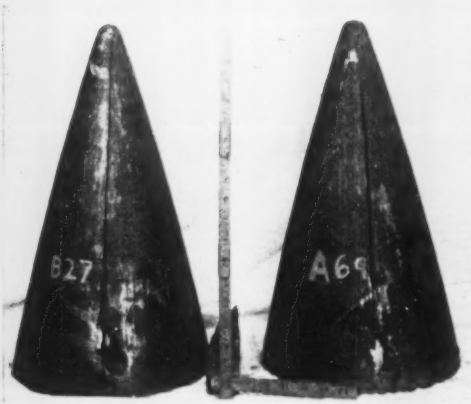
Free-Machining Bessemer, Alloy and Enduro Stainless Steels
•
Union Cold Drawn Special Sections
•
Union Cold Drawn and Ground Rounds; Turned and Polished Rounds; and Turned, Ground and Polished Rounds (Union Precision Shafting)



To examine defects, rings are cut at ½-inch intervals. Examination of etched rings reveal that cracks originated at or near the inside surface

Practical Heat Treatment Stress Relieves Stampings

By VINCENT DE PIERRE
and
HAROLD BERNSTEIN
Metallurgists
U. S. Naval Gun Factory
Washington



Above—Two cones after Magnaflux test. Powder accumulations locate the defects, all of which run in the longitudinal direction

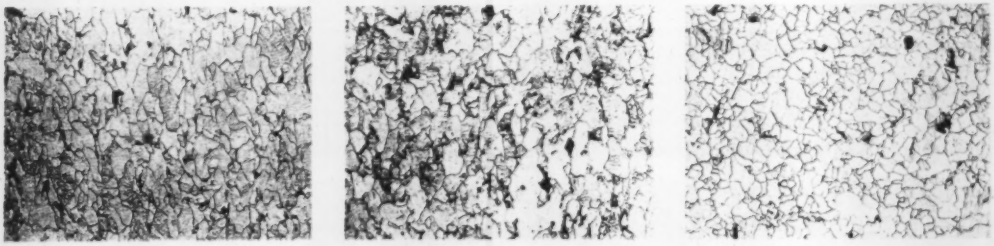
Below—Microstructure at 100X; Left to right, as received, after one hour at 950 F, after one hour at 1150 F

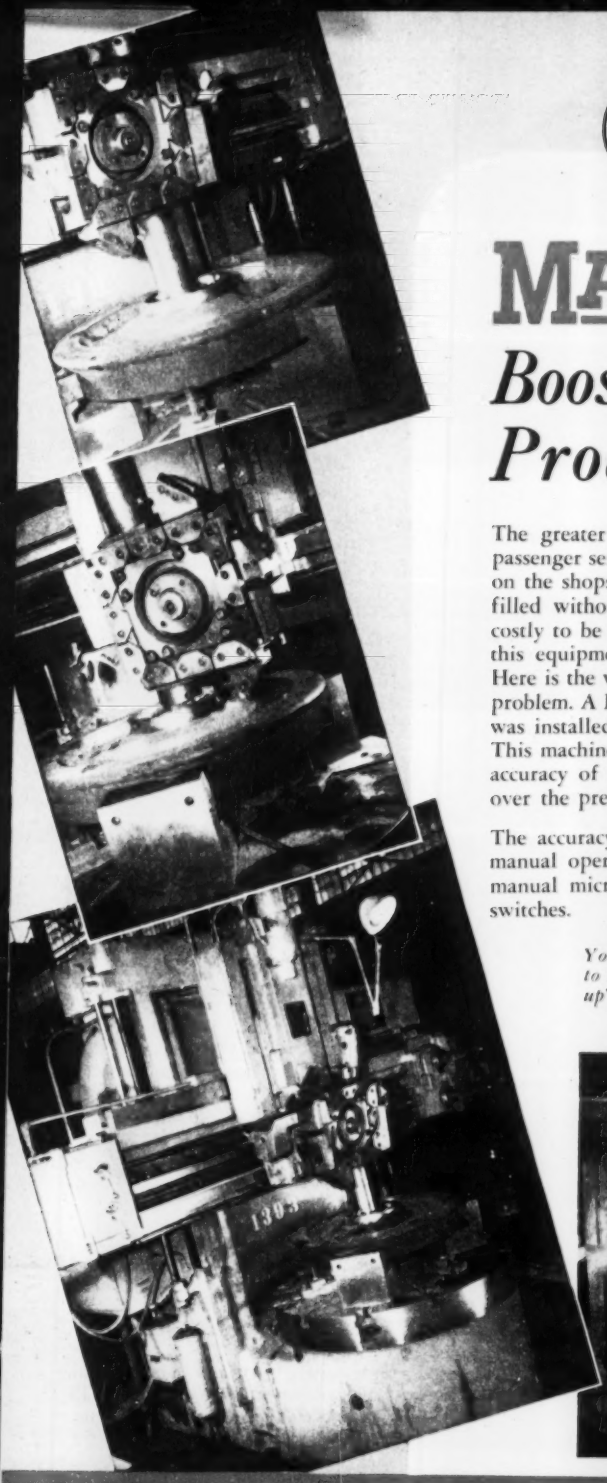
DISCOVERY of cracks in a number of one-piece steel stampings, from a lot which had been in storage for some time, initiated an investigation into the cause of failure. The stampings, in the form of right cones, 18 inches high with a 16-inch diameter base, were manufactured from low carbon sheet steel, 7/32-inch thick. Chemical analyses of three cones, selected at random are given in Table I.

Cones Magnafluxed—The cracks were first noticed on the exterior surfaces. To determine the extent of the defective condition, the cones were magnetized and dusted with Magnaflux powder. The powder accumulations located the defects, all of which ran in the longitudinal direction. To examine the defects further, rings were cut at ½-inch intervals, starting at the apex of the cone. The rings were etched in 1:1 hydrochloric acid at 170°F for 30 minutes. Examination of the etched rings revealed that the cracks originated at or near the inside surface.

Additional rings were cut from sound material. After measuring the outside diameter, the rings were slotted and the diameters measured again. In every case, an increase in diameter was noted, indicating the presence of residual stresses. Typical measurements are listed in Table II.

Direction of the change in diameter indicated the





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Boosts Diesel Wheel Production 200%

The greater use of Diesel-Electric power in freight and passenger service has placed an exceptionally heavy demand on the shops for Diesel wheels. This demand must be fulfilled without delay because Diesel motive power is too costly to be held out of service for wheels. Availability of this equipment must be kept high for greatest economy. Here is the way the Boston and Maine Railroad solved this problem. A Bullard 54" Man-Au-Trol Vertical Turret Lathe was installed in the North Billerica, Massachusetts, shops. This machine has tripled the production and improved the accuracy of boring and turning Diesel locomotive wheels over the previous 54" Bullard Vertical Turret Lathe.

The accuracy of this class of work cannot be matched by manual operation. Tool wear is even compensated for by manual micrometer adjustments of Man-Au-Trol detector switches.

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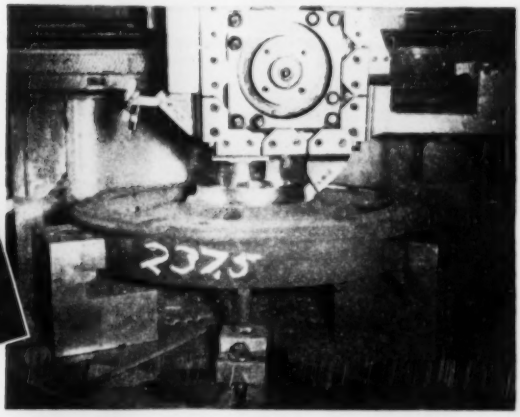


THE BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT

Results of Vickers hardness test plotted on two specimens for each temperature. Loss of hardness is small up to 950 F, but above this temperature there is a marked drop in hardness, which then holds constant over balance of range

Test ring used for stress relief investigation

type of residual stress locked up in the cone; tension on the inside and compression on the outside.

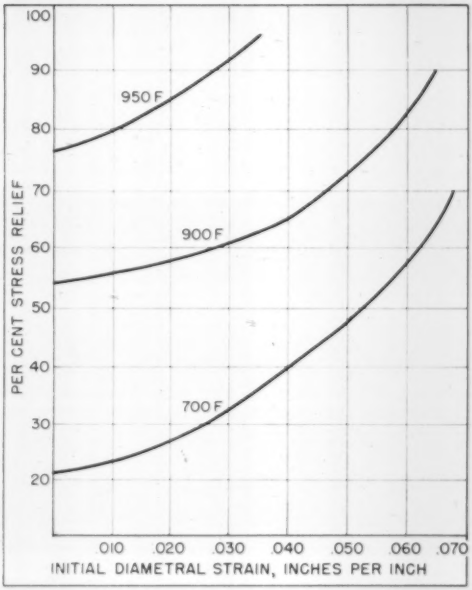
Metal Cold Worked—Examination of the microstructure revealed considerable grain distortion, indicating that the metal had been severely cold worked. The cold work had invested the structure with resid-

TABLE I
CHEMICAL ANALYSIS OF CONES

C	Si	S	P	Mn	Ni	Cr	Cu	V	Mo	Al
.07	.01	.017	.017	.29	None	None	.02	None	.01	.002
.06	.01	.028	.020	.28	None	None	.05	None	.01	.015
.09	.01	.032	.019	.28	None	None	.05	None	.01	.016

TABLE II
TYPICAL CONE MEASUREMENTS

Before Slotting	After Slotting	Change
11.924 inches	11.976 inches	+0.052
11.219 inches	11.304 inches	+0.085



Per cent stress relief plotted against initial strain. Curves demonstrate the influence of initial strain upon effectiveness of stress relieving temperature

ual stresses of sufficient magnitude to cause splitting over a period of time.

To salvage the sound cones in the lot, which presumably retained high residual stresses, a heat treatment was needed to relieve the stresses. Since a compression test was required of the cones, it was necessary that the heat treatment have no deleterious effect on mechanical properties. The effect of heat treatment upon hardness was first determined.

Half-inch squares of the cone material were treated for 1 hour at temperatures ranging from 600 to 1300°F. The loss of hardness was small up to 950°F, but above this temperature there was a marked drop in hardness, which then held constant over the balance of the range. Examination of the microstructure showed little change at 950°F, but definite evidence of recrystallization after treatment at 1150°F.

Heat Treatment Tested—Effect of heat treatment upon residual stresses was then determined. Test rings of cone material were adapted as follows:

1. Arcs were cut out.
2. Two steel right angles were bolted on the outside of the ring, flush with the cut edge.
3. An alloy steel stud was placed through oversize holes in the upright legs of the angles, and nuts were attached to each end of the stud.

The ring was stressed by tightening the nuts, which reduced the diameter and induced strains like those originally encountered in the cones. Diameter of the ring was measured before and after loading. The ring was then heat treated for 1 hour at temperature and air cooled; the nuts were loosened and the diameter measured again. From these measure-

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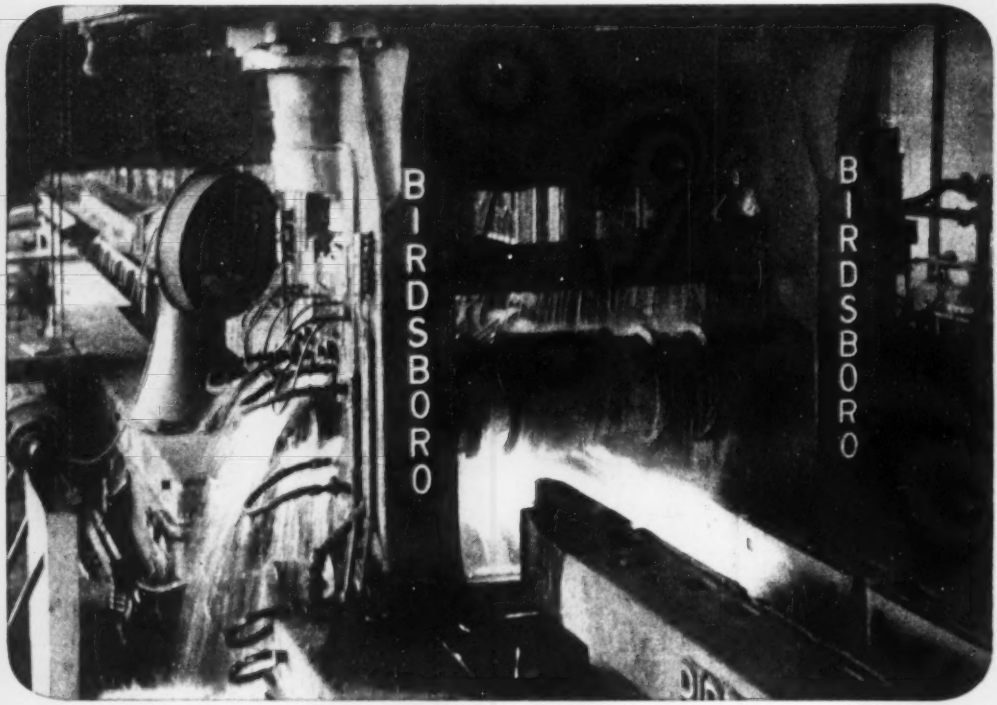
SPEED UP *Mass Production of Steel with*

BIRDSBORO BLOOMING MILLS



If this is your Problem— Mass production of high quality stainless, high speed, automobile and special purpose alloy steels with minimum labor costs.

Here is the Solution— This 2-high, rapid reversing 26-in. blooming mill with fast screw-down and rapid manipulation, operated by two men.

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MM 19-51

ments, the initial diametral strain and the percent stress relief were calculated:

$$\text{Diametral Strain (inches/inch)} = \frac{\text{Original Diameter—Stressed Diameter}}{\text{Original Diameter}}$$

$$\% \text{ Stress Relief} = \frac{\text{Original Diameter—Final Diameter} \times 100}{\text{Original Diameter—Stressed Diameter}}$$

Percent stress relief was plotted against initial strain for three temperatures, 700°, 900° and 950° F. The curves demonstrate the influence of initial strain upon the effectiveness of stress relieving temperature. At 950°F, for example, 99 per cent relief was obtained at a strain level of 0.036-inch per inch. Less relief was obtained at lower temperatures.

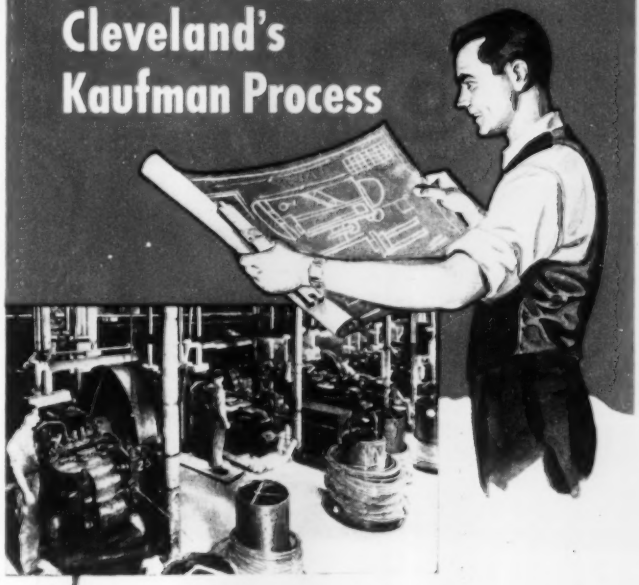
Strains Predicted—To get a clearer picture of the magnitude of the induced strains, the yield point of the material, in terms of diametral strain, was determined. It was found to be approximately 0.070-inch per inch diametral strain. Thus it was possible to predict that strains near the yield point of the cone material would be completely relieved by a heat treatment of 1 hour at 950°F.

The strength test required that a 5-inch frustum section from the base of the cones withstand a load of 175,100 pounds, with a maximum deflection of 0.0200-inch. Accordingly, test sections were cut from one cone treated at 950°F, and from one cone treated at 1150°F. The specimens were compressed between two hardened ground plates. Deflection measurements were obtained from indicator dials. The test specimen treated at 950°F exhibited an average deflection of 0.0100-inch at the prescribed load of 175,100 pounds and a yield point at 270,000 pounds. The test specimen treated at 1150°F exhibited a yield point at 141,500 pounds.

2000 Cones Processed—Test results showed that cones made of low carbon steel sheet, which contained residual stresses from the manufacturing operations, could be effectively stress relieved without impairment of mechanical properties by heat treatment at 950°F for 1 hour. This procedure was successfully utilized in the shops for stress relieving 2000 cones in a car-bottom gas-fired furnace equipped with automatic temperature control.

The cones, in lots of 200, were stacked one high on the car-bottom, and loaded into the furnace cold. They were heated to temperature in 7 hours, held 1 hour at temperature and cooled to 100°F in 16 hours. One cone from each lot was tested for residual stresses and compressive strength. The results were in good

Simplify your special parts* production problem with Cleveland's Kaufman Process



Have your unusual *fastener-type parts made to your specifications by extrusion forging. Cleveland's Kaufman Process guarantees a tougher product, accurate in every dimensional detail—usually ready for use without machining. This method is faster, therefore more economical in most cases. The steel and heat treatment you specify are followed to "the letter".

Relieve your shop of this production problem. Have your quantity-run fastener-type specials made better and faster at Cleveland. Write for folder "Specials by Specialists."

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CLEVELAND Top Quality FASTENERS

originators of the Kaufman DOUBLE EXTRUSION Process
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AIRCO ACCURACY... PRECISION ... OPERATING ECONOMY

designed into the all new

AIRCO NO.50 TRAVOGRAPH

GAS CUTTING MACHINE

Airco's NEW No. 50 Travograph is a rugged, all-welded gas cutting machine. Its massive, long-lived design is engineered to give fingertip sensitivity to all production operations. Used as a basic tool for multi-torch shape cutting, squaring or beveling, its outstanding accuracy slashes reject loss and working costs to a minimum.

Today's most modern production tool, the rugged new Airco No. 50 Travograph precision-cuts steel—light plates, heavy slabs, billets, forgings—to close tolerances. Here are the reasons for its remarkable exactness . . . the "why" it guarantees faithful reproduction.

1. All-welded construction provides a combination of ruggedness, resistance to vibration, and precision operation.
2. Rigidity built into the torch-bearing pantograph arms enables the torch bar to support a uniform load of *500 lbs!*
3. Perfectly-balanced when properly set on 16' rails.
4. Ball bearings in the hinge joints make it extremely smooth operating.

For greatest operating flexibility, the new No. 50 Travograph can be equipped with three distinctly different tracing devices—manual, magnetic, or the full-automatic "Electronic Bloodhound". The "Electronic Bloodhound" needs only an outline drawing or silhouette to cut the most intricate shapes smoothly, sharply, quickly . . . and with extreme accuracy.

If your production line requires quantity flame shaping operations . . . and if close precision cutting would lower your finish-machining costs . . . it will pay you to investigate Airco's new No. 50 Travograph. For complete information write your nearest Airco office for the new catalog just coming off the press.

AIRCO

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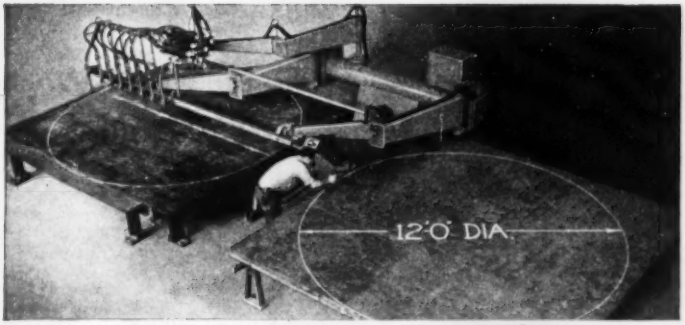
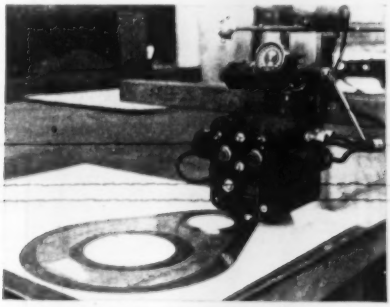
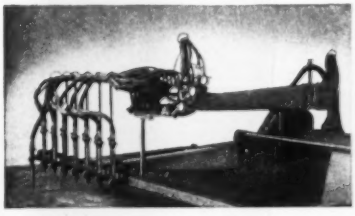


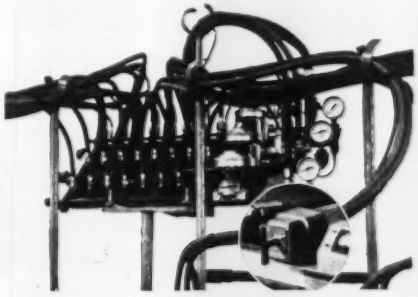
WIDE CUTTING RANGE — The No. 50 Travograph cuts circles up to 144" and any shape that does not exceed 92" x 144" on one side. Carriage speeds range from 2" to 35" per minute on the low side; 10" to 168" on the high side, permitting a wide cutting range and allowing high speed positioning over the work.



ELECTRONIC TRACING DEVICE — The Electronic Tracer assures faithful reproduction with extreme accuracy. An outline drawing or a paper cut-out, is easily prepared. Inside and outside square corners, obtuse and acute angles, long slim projections, narrow slots and intricate contours — in any quantity — are all possible with this tracer. It follows the outline automatically, and so accurately that in most cases further machining is unnecessary.

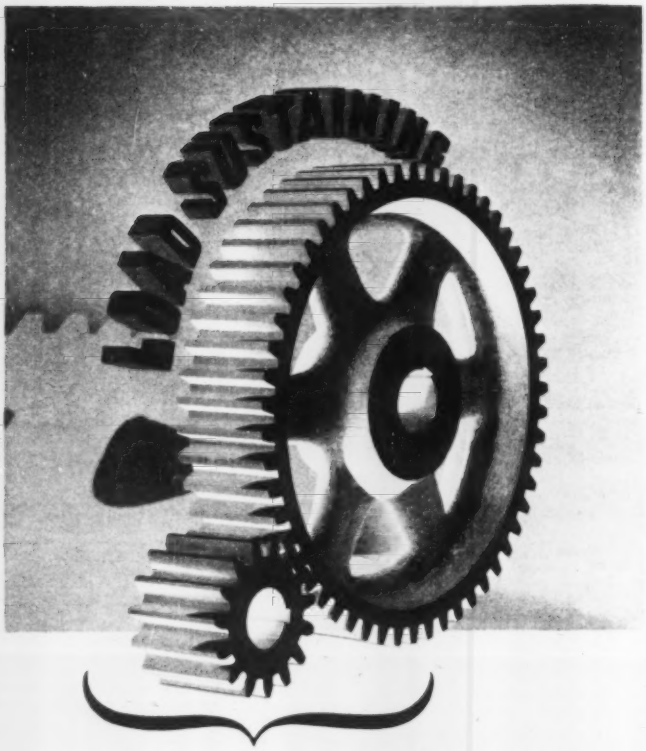
SELF-SUPPORTED MANIFOLD — This individual pantograph arm supports the entire weight of the gas distribution equipment, and is guided by the tracer bar, so that the manifold-torch relationship remains constant. The useful load capacity of the tracer bar is greatly increased because it carries no gas equipment except torches.





GAS DISTRIBUTION SYSTEM — A twist of the selector switch located on the remote control box at the "operator's station" gives complete control of preheating gases and cutting oxygen. This operates one to eight torches, and assures a properly adjusted flame for repetitive cutting operations. This remote control is made possible by solenoid operated valves located on the manifold.

DESIGNERS OF FLAME CUTTING MACHINES FOR EVERY PURPOSE



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THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

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agreement with those obtained in the laboratory. In addition, the base diameters were checked for distortion, which was found to be negligible.

Industrial Gas from Lignite

About 10.2 million cubic feet of potential industrial gas were produced from lignite during the 18th experimental run recently completed in the Bureau of Mines pilot plant at Grand Forks, N. Dak. The test run was the longest to date and was voluntarily shut down after 947 hours of operation. It used 438,415 pounds of lignite donated by six mining companies located in North Dakota and Saskatchewan, Canada. The railroads provided free transportation of the lignite to the plant.

During the 18 test runs made at the plant since it began operating in 1945, about 85 million cubic feet of gas have been produced. The gas which may provide a way to make greater use of the nation's 355.7 billion tons of recoverable lignite reserves could be used in various industrial processes. During the gasification, lignite is fed into the top of an 18-foot long circular retort made of chromium nickel alloy, heat is applied to the retort, steam is introduced with the lignite and water gas produced. Often called blue gas because of the color of the flame, it is composed chiefly of hydrogen and carbon monoxide.

Nickel Kegs Get Special Handler

EQUIPPING a 4000-pound capacity fork truck made by Mercury Mfg. Co., Chicago, with a special ram type suspension arm has cut keg handling time at Whitehead Metal Product Co.'s Philadelphia plant by 75 per cent. Multiple stacking of kegs also saves on floor space requirements. The electrolytic nickel kegs formerly were hauled through the plant by hand truck and stood on end. Now the attachment picks them up four at a time and hauls them at 5 mph

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In your product planning for tomorrow, include SUPERIOR Stainless—for the sales appeal and fabricating dependability that will make future profits assured!

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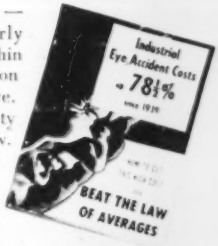
The cost of these lost man hours is about $160,000,000 apart from compensation, medical, idle machine charges and other costs. Yet the safety goggles that *prevent* 98% of eye accidents average $2.30 in cost or only 74 cents more than the loss of just *one man-hour* of productive time. (Current average hourly earnings of factory workers $1.56.)

In these days of capacity production and short supply of skilled workers, an AO Eye Protection Program deserves your serious consideration — *more than ever.* Particularly when it can pay for itself within six months time in the production it protects and the costs it can save. Ask your nearest AO Safety Representative to show you how.



ASK YOUR SECRETARY TO WRITE FOR THIS FREE BOOKLET, "BEAT THE LAW OF AVERAGES." ADDRESS: DEPT. CP1210.

American Optical COMPANY
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

Improved Enamels

(*Concluded from Page 72*)

total manufacturing cost and consequent cost to the user, No. 11 seemed to be a happy medium. Recent experiences reported by numerous users indicate that this corrosion resistant finish with the addition of a refractory material which continues to resist heat while the carrier, the base enamel, begins to soften consistently will deliver 150 to 200 minutes average chlorinating life. Four quantity users recently reported 151, 168, 180, and 200 minutes average life in their plants.

If you take these four sets of figures and strike an average of 175 minutes, it is seen that the life expectancy of ceramic coated pipe over uncoated pipe is from 15 to 25 times. Since the material costs roughly five times as much as plain pipe, the saving is obvious.

Questions which arose as use of the material increased were: (1) How much iron pickup will there be in any given heat from ceramically coated steel fluxing pipe; (2) is there any contamination by injurious chemicals to change metal composition; (3) will the coating spall, causing sheet and ingot imperfection? Exhaustive checking has failed to reveal any appreciable iron pickup using coated pipe, compared to dangerous pickup using uncoated pipe. No contamination of metal and no sheet or ingot imperfections have been detected.

Other Applications Seen—Experimentation and testing still are going on both with regard to coating materials and improved methods of application. That improvement is continuing is evidenced by the fact that each succeeding lot of tubes has a better appearance than the last. Users also have tempered shop practice so as to realize maximum life and value from the material.

It is felt there are perhaps many other applications where resistance to heat and corrosion are problems for which ceramic finishes may provide the solution. It must be borne in mind, however, that in dealing with this one item, the normal attrition rate is tremendously accelerated by its peculiar use.

Were the fluxing tubes discussed not subjected to the vicious attack of chlorine gas they perhaps would deliver long enough life so that ceramic coating would not be good economy. Shop practice and its effect on equipment ceramically coated is a matter for serious consideration; in order to realize maximum benefit from ceramic coatings it may have to be altered.

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Yes, here's your chance to see for yourself the braided wire fabric of which TUFFY Slings are made. Tie it in knots, kink it—then see how easily a Tuffy sling can be straightened out without material damage.

Patent No. 2,454,417

HOW Tuffy SLINGS ARE MADE

Scores of wires are stranded into nine parts, then machine woven into an interlaced wire fabric. This braided fabric gives extra safety and enduring strength. Even cutting one of the 9 parts does not result in stranding of the sling.

11 TYPES—PROOF TESTED FOR SAFETY

There are 11 different types of Tuffy Slings, each one proof-tested to *twice* its safe working load. And the safe working load is plainly marked on metal tags on each sling. Also, Union Wire Rope engineers will help work out special sling problems. If you have your own rigging loft, Tuffy braided wire fabric is available by the reel.

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To show you the difference between TUFFY Braided Wire Slings and ordinary wire rope slings, we have made up a quantity of 3-foot slings. We want you to have one so that you can test it and prove to yourself that TUFFY Slings really are better. Mail the coupon below today for yours.

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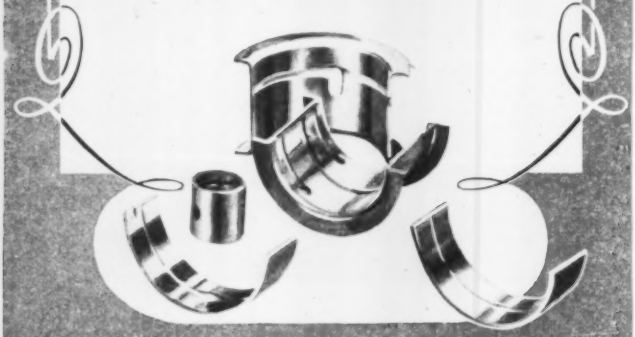

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CALENDAR
OF MEETINGS

‡ *Denotes first listing in this column.*

October 22-26, American Institute of Electrical Engineers: General fall meeting, Hotel Cleveland, Cleveland. Association address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

October 23-26, Gray Iron Founders Society Inc.: Fall meeting, Edgewater Beach Hotel, Chicago. Society address: 210 National City—E. 6th St. Bldg., Cleveland. Executive vice president: Donald H. Workman.

October 26-27, American Institute of Mining and Metallurgical Engineers, National Open Hearth Steel Committee: Annual meeting, Southern Ohio section, Deshler Wallick Hotel, Columbus, O. Institute address: 29 W. 39th St., New York 18. Section chairman: V. W. Jones, Armco Steel Corp., Middletown, O.

October 28-30, Conveyor Equipment Manufacturers Association: Fall meeting, The Homestead, Hot Springs, Va. Association address: 1129 Vermont Ave., Washington 5. Executive vice president: R. C. Sollenberger.

October 29-31, American Gear Manufacturers Association: Semi-annual meeting, Edgewater Beach Hotel, Chicago. Association address: 302 Empire Bldg., Pittsburgh 22. Executive secretary: John C. Sears.

October 29-31, National Lubricating Grease Institute: Fall meeting, Edgewater Beach Hotel, Chicago. Institute address: 4638 Nichols Parkway, Kansas City 2, Mo. Executive secretary: Harry F. Bennetts.

‡**October 29-November 1, Society of Automotive Engineers:** Transportation meeting, Hotel Knickerbocker; Fuels and Lubricants meeting, Drake Hotel, Chicago. October 29-30, Diesel Engine meeting, Drake Hotel. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

October 31-November 2, Foundry Equipment Manufacturers Association: Fall meeting, The Homestead, Hot Springs, Va. Association address: Engineers Bldg., Cleveland 14. Executive director: Arthur J. Tuscany.

October 31-November 2, Porcelain Enamel Institute Inc.: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute address: 1010 Vermont Ave., N.W., Washington 5. Secretary: Edward Mackasey.

NOVEMBER

November 1-2, Industrial Management Society: Annual time-motion study and management clinic, Sheraton Hotel, Chicago. Society address: 35 E. Wacker Drive, Chicago 1.

November 1-3, Audio Engineering Society: Annual convention & audio fair, Hotel New Yorker, New York. Society address: 67 W. 44th St., New York.

November 1-4, National Tool & Die Manufacturers Association: Annual convention, Statler Hotel, St. Louis. Association address: 906 Public Square Bldg., Cleveland. Executive secretary: George S. Eaton.

‡**November 2, American Institute of Mining and Metallurgical Engineers, National Open Hearth Steel Committee:** Annual meeting, Pittsburgh Section, William Penn Hotel, Pittsburgh. Section chairman: H. E. Warren Jr., U. S. Steel Co., Pittsburgh.

November 2-3, Illinois Mining Institute: Annual fall meeting, Hotel Abraham Lincoln, Springfield, Ill. Institute address: 28 E. Jackson Blvd., Chicago 4. Secretary-treasurer: B. E. Schonthal.

November 4-7, National Screw Machine Products Association: Fall meeting of committee, directors and executive groups, The Homestead, Hot Springs, Va. Association address: 13210 Shaker Square, Cleveland 20. Secretary: Margaret Bollinger.

‡**November 5-8, American Petroleum Institute:** Annual meeting, Stevens Hotel and Palmer House, Chicago. Institute address: 50 W. 50th St., New York. Information chairman: John L. Dupree.

(Continued on p. 102)

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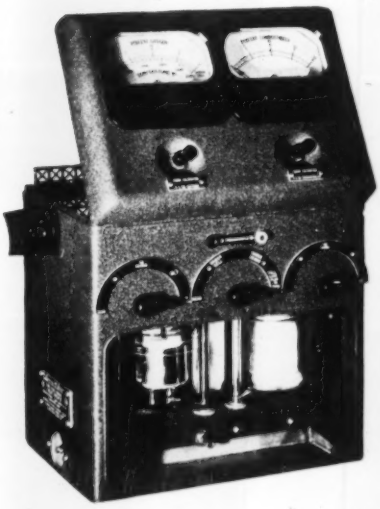

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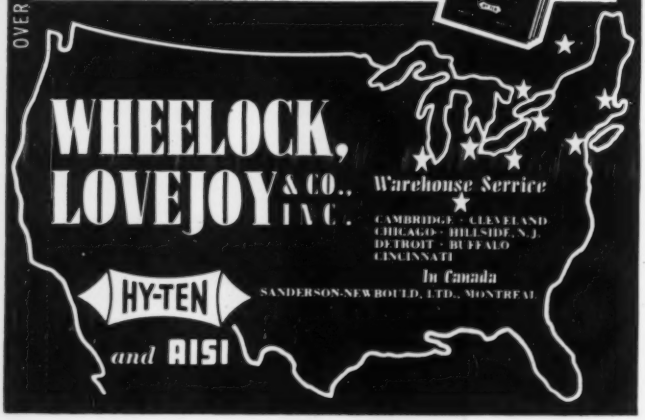

(Continued from p. 100)

Nov. 7-9, Annual Mechanite Research Meeting: Hotel New Yorker, New York. Sponsor's address: Mechanite Metal Corp., Pershing Bldg., New Rochelle, N. Y.

November 7-9, National Machine Tool Builders Association: 50th annual meeting. The Homestead, Hot Springs, Va. Association address: 10525 Carnegie Ave., Cleveland. Secretary: Frida F. Selbert.

†**November 7-9, American Society of Body Engineers:** Annual technical convention and exhibit, Rockham Memorial Bldg., Detroit. Society address: 100 Farnsworth Ave., Detroit 2. Secretary: H. V. Atnip.

†**November 7-9, Pittsburgh Business Show:** William Penn Hotel, Pittsburgh. Sponsor: Pittsburgh Business Show Committee. Secretary: J. E. Schultz, c/o Pittsburgh Plate Glass Co., 2000 Grant Bldg., Pittsburgh 19.

November 7-10, National Conference on Coastal Engineering: Hotel Rice, Houston. Secretary: C. E. Balleisen, c/o Southwest Research Institute, San Antonio, Tex.

†**November 8-9, National Conference on Industrial Hydraulics:** Sherman Hotel, Chicago. Sponsor: Illinois Institute of Technology. Conference secretary: John G. Duba, Technology Center, Chicago 6.

November 8-10, Steel Founders Society of America: T & O conference, Carter Hotel, Cleveland. Society address: 920 Midland Bldg., Cleveland. Secretary: F. Kermit Donaldson.

November 8-11, Automotive Parts Rebuilders Association: Fall meeting, Stevens Hotel, Chicago. Association address: 1414 S. Michigan Ave., Chicago. Secretary: Jack O'Sullivan.

November 9, American Iron & Steel Institute: Regional technical meeting, Hotel Mark Hopkins, San Francisco. Institute address: 350 Fifth Ave., New York. President: Walter S. Tower.

†**November 11-13, National Association of Suggestion Systems:** National convention, Hotel Statler, Detroit. Association address: 122 S. Michigan Ave., Chicago 3. Secretary: J. R. Olson, c/o Peoples Gas Light & Coke Co., Chicago.

November 12-15, National Automatic Merchandising Association: Convention & exhibit, Public Auditorium, Cleveland. Association address: 7 S. Dearborn St., Chicago 3. Executive director: Clinton S. Darling.

November 12-16, National Electric Manufacturers Association: Annual fall meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Association address: 155 E. 44th St., New York 17. Managing director: W. J. Donald.

†**November 14-15, Industrial Hygiene Foundation:** Annual meeting, Mellon Institute, Pittsburgh. Foundation address: 4400 Fifth Ave., Pittsburgh 13. Managing director: John F. MacMahon.

November 14-16, National Metal Trades Association: Annual convention, Palmer House, Chicago. Association address: 122 S. Michigan Ave., Chicago 3. Commissioner: Homer D. Sayre.

November 15-16, The Magnesium Association: Fall meeting, Biltmore Hotel, New York. Association address: 122 E. 42nd St., New York 17. Assistant secretary: Martha I. Hanson.

†**November 15-16, American Zinc Institute:** Fall meeting, The Galvanizers Committee, St. Francis Hotel, Canton, O. Institute address: 60 E. 42nd St., New York 17. Secretary: E. V. Gent.

November 16, Association of American Railroads: Fall conference, Blackstone Hotel, Chicago. Association address: Transportation Bldg., Washington 6. Secretary-Treasurer: G. M. Campbell.

November 26-December 1, Chemical Industries Exposition: Grand Central Palace, New York. Manager: Charles F. Roth, International Exposition Co., New York; chairman: E. R. Weidlein, Mellon Institute.

†**November 28-30, Scientific Apparatus Makers Association:** Mid-year meeting, industrial, optical, aeronautical and military instrument sections, Hotel New Yorker, New York. Association address: 20 N. Wacker Drive, Chicago 6. Secretary: Kenneth Anderson.

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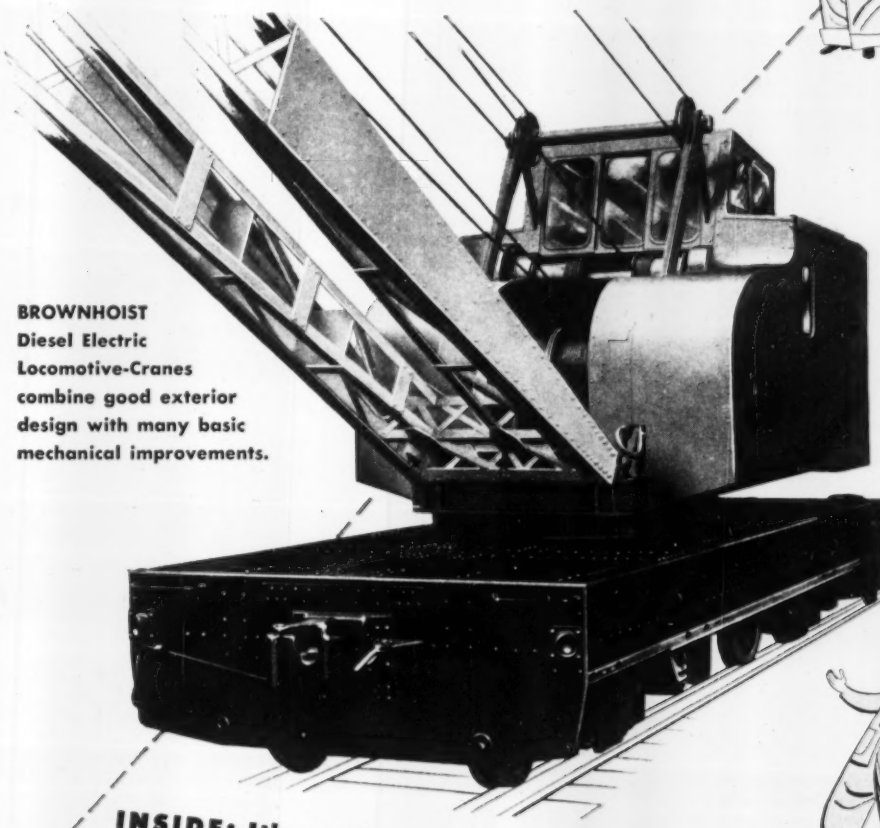

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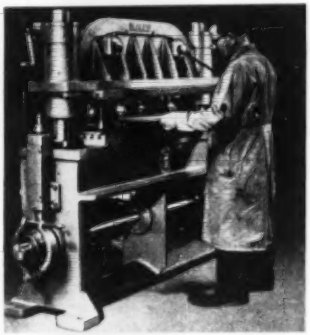
New Products and Equipment

Twin Column Punch Presses

Wales-Strippit Corp., 345 Payne Ave., N. Tonawanda, N. Y., announces twin column punch presses for all types of blanking, forming, drawing and bending. In addition, hole punching and notching equipment is used efficiently and a self-contained shearing attachment is



. . . ram guides' position reduces wear

available as optional equipment. Cylindrical ram guides have a 4-inch diameter, are precision ground, highly polished and vertically positioned at 90 degrees to reduce wear. The ram actuating mechanism operates inside vertical ram posts.

Guide sleeves are hand scraped, individually fitted and held to tolerances of 0.00025-inch. Bottom face of ram is machined for accurate mounting of dies. Dual purpose clutch counterbalance supplements conventional friction-type brake that is installed on the end of the shaft. Knock-out attachment, punch shank adapter, pneumatic draw die cushions, friction-clutch arrangement, variable speed arrangement and self-contained shearing die attachment are available as optional equipment.

Check No. 1 on Reply Card for more Details

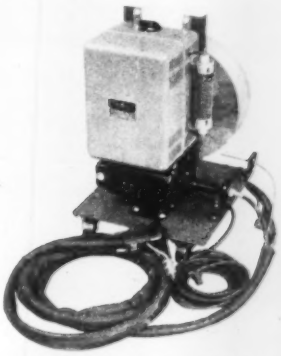
Tester Records Vickers Values

Isoma hardness tester for measuring Vickers values is introduced in the United States by Cosa Corp., 405 Lexington Ave., New York 17, N. Y. Tester has an automatic weight selecting device for applying dead weight loads from 50 to 1000 grams. It tests flat pieces with minimum thickness of 0.0005-inch; rounds with minimum diameter from 0.003 to 0.005-inch. Maximum distance between indenter and table is 2-13/64 inches. Optical measuring system measures impressions accurately to within 0.000004-inch. A transformer operating on 110 or 220 v is included as standard equipment.

Check No. 2 on Reply Card for more Details

Speeds Alloy-Metal Welding

Speeding alloy-metal welding on applications where filler-metal must be added is the function for a welding attachment made by the Welding Department, General Electric Co., Schenectady 5, N. Y. Called Filler-weld, and used with gas-shielded arc welders, the unit allows the operator to control continuous flow of filler metal automatically by a finger



. . . torch controls filler-metal flow

switch mounted on the torch. The unit comprises two main elements: A torch and mechanical power unit.

The torch, or gun, accommodates tungsten from 0.040 to 5/32-inch diameter up to 7 inches long at a rating of 250 amp. Power unit consists of a motor that provides power for drawing filler-metal, motor control apparatus and a spool that holds the filler wire.

Check No. 3 on Reply Card for more Details

Press Line Has Friction Clutch

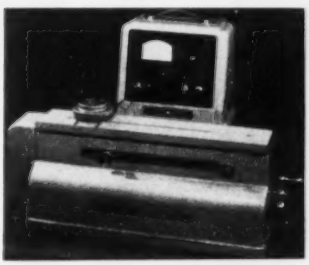
Development of an air friction clutch, spring and air-applied brake combination for use with its line of power presses is announced by Sales Service Machine Tool Co., 2363 University Ave., St. Paul, Minn. Clutch and brake are both of constricting drum type, using centrifugal force to assure instant disengagement of friction surfaces when released. Brake is applied by a constant pressure spring opened and released by air; its actuation opens a valve to release air from the clutch. Interlocking design prevents either from being engaged while the other is operating.

Clutch and brake shoe linings are self-compensating for wear and flywheel bearings are seal-packed to help assure maximum length of operation without adjustment or maintenance. Variable clutch gripping pressure permits operator to set clutch grip for every job, thus reducing possibility of injury to operator or damage to dies and press when dies jam. Clutch's optimum efficiency is at pressures from 40 to 80 pounds but the unit operates successfully at pressures as low as 25 pounds.

Check No. 4 on Reply Card for more Details

Electronic Gaging Head

Sheffield Corp., Dayton 1, O., is supplying a remote electronic gaging head with its tool room and gage laboratory model N-6 Internalchek. Standard dual amplifications are 1000 2000, 300 3000, 5000 10,000 to 1, with other amplifications available on special order. Gage head consists primarily of a highly stabilized ac vacuum tube circuit that gives indi-



. . . a check on internal dimensions

cation on a high speed meter. Built-in regulating transformer controls fluctuations of 95-125 v to within 1 per cent to assure maximum tube life. Elimination of drift in the circuit permits accurate measurements continuously or intermittently without constant resetting. Scale is linear both sides of zero.

Minimum diameter of gaging range is 0.370-inch; maximum diameter is 12 inches. Maximum gaging depth from surface plate to center of diamond point is 1½ inches. By turning the part over, another 1½-inch depth can be checked, making it possible to explore a hole 3 inches deep throughout for diameter, taper, bell mouth and out-of-round conditions.

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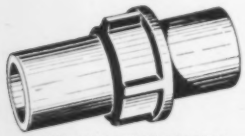

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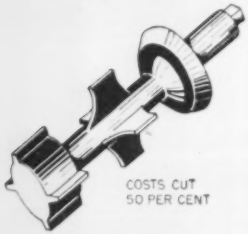

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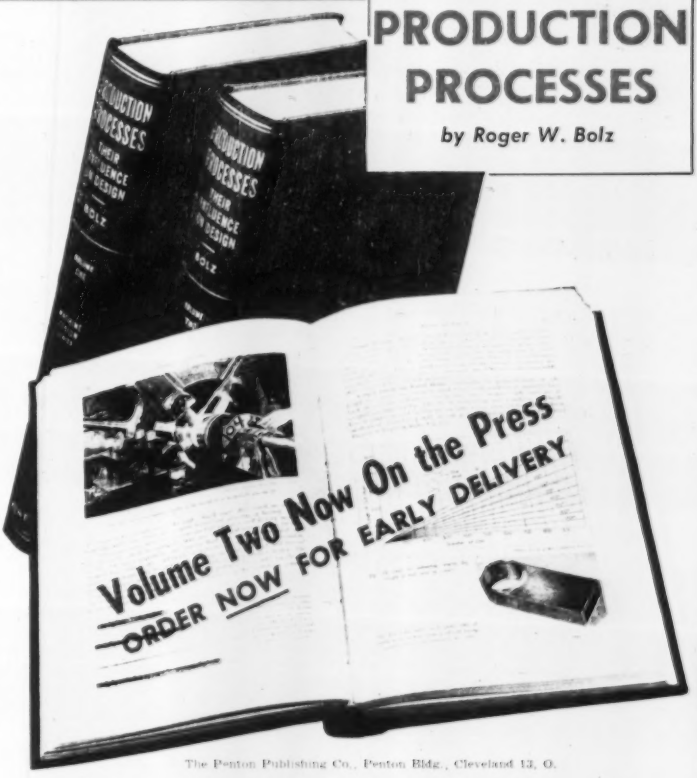

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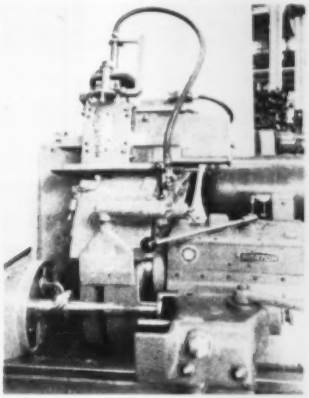
Check No. 5 on Reply Card for more Details

Truing Tool Runs By Pushbutton

Pushbutton control of the truing unit, available for all its cylindrical grinding machines, is a development of Norton Co., Worcester 6, Mass. The device automatically performs angular, step, straight or combination formed wheel face truing, eliminating operating burden normally involved in performing these functions with nonautomatic equipment. The



. . . cuts down manual operating time

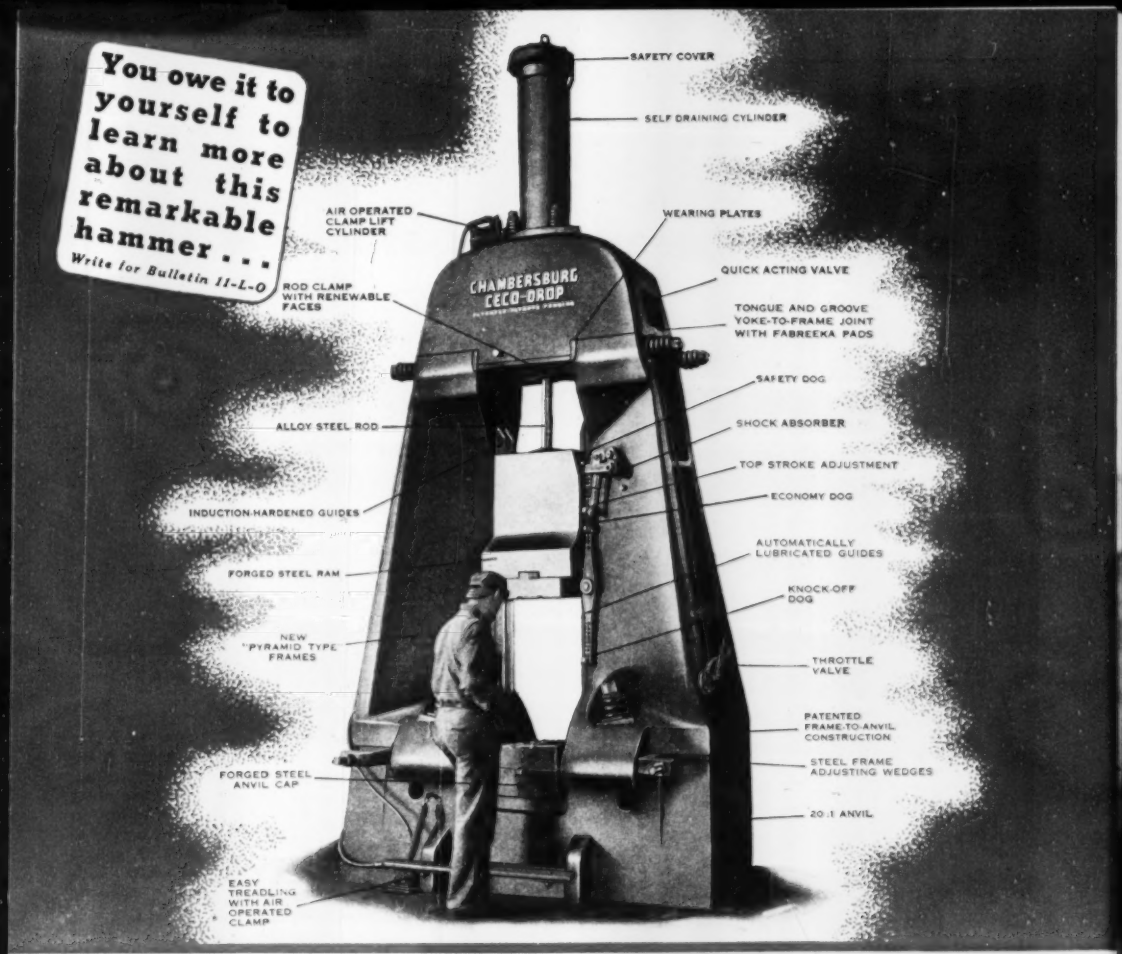
diamond truing tool located inside the wheel guard makes a round trip at a predetermined feed and speed across the wheel face when the device is actuated through a push button control. Rate of speed of diamond travel when not in contact with the wheel is increased automatically to reduce overall truing time.

Advantages of the wheel guard truing device include close control over the amount of abrasives removed from the wheel, reducing wheel costs per piece ground. It trues the wheel without disturbing table settings and without a special positioning of the wheel head. In addition it operates with speed and consistency, eliminating exercise of skill and judgment for the operator by relieving him of manual operation.

Check No. 6 on Reply Card for more Details

Lathe Has Three Operations

Development of a shell lathe, made in three sizes to handle shells from 75 to 240 mm, is announced by Wm. K. Stamets Co., Jenkins Arcade Bldg., Pittsburgh 22, Pa. Lathes perform three machine operations: Cut off the open end to proper length and face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CECO-DROP

• *The Boardless Gravity Drop Hammer* •

No Boards • No Front Rod • No Back Rod
Costs less to operate . . . Forges more minutes per hour . . . Is safer and easier to operate . . . This hammer is setting new records in cutting forging costs and in increasing production.

CHAMBERSBURG ENGINEERING CO., CHAMBERSBURG, PA.

Funnels, Furniture & Fine Finishes

FOLLANSBEE COLD ROLLED STRIP STEEL can be fed right from the coil into high-speed machines for fabricating most anything from funnels to furniture. Moreover, Follansbee Cold Rolled Strip is furnished in a wide variety of tempers and finishes to meet most demands.

For efficiency and economy in continuous operations, you'll find it worthwhile to try Follansbee Cold Rolled Strip Steels. All are supplied in coils for automatic productioneering, with mechanical and physical specifications to fit most needs. The Follansbee Steel Representative nearest you will give you full information.

FOLLANSBEE STEEL CORPORATION

GENERAL OFFICES, PITTSBURGH 30, PA.

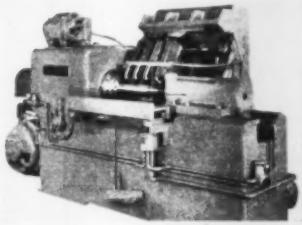
SEAMLESS TERNE ROLL ROOFING • COLD ROLLED STRIP
POLISHED BLUE SHEETS AND COILS

Sales Offices—New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee. *Sales Agents*—Chicago, Indianapolis, Kansas City, Nashville, Los Angeles, San Francisco, Seattle, Toronto and Montreal, Canada. *Mills*—Follansbee, W. Va.

Follansbee Metal Warehouses—Pittsburgh, Pa., Rochester, N.Y., and Fairfield, Conn.

the base; rough turn; and finish turn. Machine consists of a bed with integral headstock, a separate tailstock and a separate tool slide and cam unit. Spindle is mounted in the headstock on antifriction bearings and is driven by a worm gear with chain drive to the spindle motor. Chuck in the spindle is expanding grip type operated efficiently by a rotating air cylinder.

Tool unit contains sliding tool blocks that hold the tools and are moved into the work by cam rollers operated through contact with the cams. Tools for cutoff and facing



. . . handles shells from 75 to 240 mm

operations are fed by rotating cams driven by a gear train from the spindle through change gears. Tools for turning operations are fed into the shell as cam rollers move along overhead cams. Tailstock is an air-operated piston with live center to hold the base of the shell. A section of roller conveyor and loading rails are provided to assist in handling shells.

Check No. 7 on Reply Card for more Details

Precision Welding Positioner

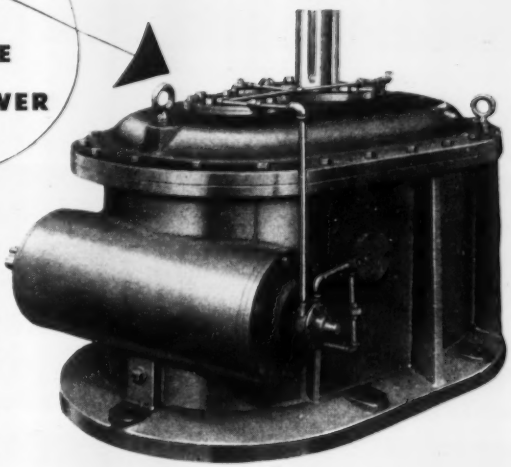
Welding positioner developed by Aronson Machine Co., Arcade, N. Y., features precision rotation and fast positioning. Its 2-hp motor runs either direction, controlled by push-button and magnetic reversing starter that also sets ICB brake when motor starts. The motor runs continuously while machine is in operation, eliminating lag when table rotation is required.

Table rotates at either a constant speed of 4 rpm for quick positioning or at selected infinitely variable speeds from 0 to 2.73 rpm. Table rotation can be connected to the welder to permit starting and stopping both arc and rotation of table at selected time cycles.

Table is 24 inches diameter, with round, plain, machined surface for mounting fixtures by tapping directly into top plate. Tables can be supplied up to 40 inches in diameter. Tilt and elevation use a 3 hp brake gear

have you a drive problem?

A FOOTE BROS.
WORM-HELICAL DRIVE
MAY PROVIDE THE ANSWER



● Rugged strength, the ability to stand up under punishing loads, the highest possible efficiency — these are characteristics of Foote Bros. Worm-Helical Drives.

Input shafts are horizontal, output shafts vertical, up or down — making these units ideal for use in chemical plants, pulp mills or wherever materials must be agitated or mixed.

Foote Bros. Worm-Helical Drives are available in ratios from approximately 25 up to 285 to 1—capacities up to 128 h.p. See your Foote Bros. representative or mail the coupon for information.

FOOTE BROS. GEAR AND MACHINE CORPORATION
4545 S. Western Boulevard • Chicago 9, Illinois

Whatever your requirements in power transmission, you will find exactly the drive best suited to your needs in the complete Foote Bros. line of enclosed gear drives and gearmotors. Check the coupon indicating the drive in which you are interested.

FOOTE BROS.
Better Power Transmission Through Better Gears

Foote Bros. Gear and Machine Corporation
Dept. X, 4545 S. Western Boulevard, Chicago 9, Illinois
Please send bulletins on drives checked below.

- ☐ WORM-HELICAL DRIVES
- ☐ LINE-O-POWER STRAIGHT LINE DRIVES
- ☐ MAXIPOWER HELICAL GEAR DRIVES
- ☐ HYGRADE WORM GEAR DRIVES
- ☐ FOOTE BROS.-LOUIS ALLIS GEARMOTORS

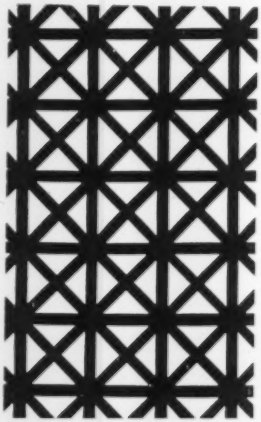
Name .....
Company ..... *Position* .....
Address .....
City ..... *Zone* ..... *State* .....

Hendrick Ornametal

TRADE MARK

This is a lightweight type of grille especially suited for radiator enclosures, stove panels, kitchen cabinets, clothes and broom closets, lockers, and similar applications. It is made of a special bright finish, cold rolled steel, suitable for painting or plating, and is available in a wide range of stock size sheets and gauges.

Hendrick Ornametal can be furnished in a variety of attractive designs, the one illustrated being "Smalcane." Write for full information.



1876—Seventy-Fifth Anniversary—1951

SEE OUR CATALOG IN SWEET'S

HENDRICK

Manufacturing Company

Perforated Metals
Perforated Metal Screens
Wedge-Slot Screens
Architectural Grilles
Mitco Open Steel Flooring
Shur-Site Treads, Armorgrids

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Sales Offices In Principal Cities

DO YOUR PART

KEEP SCRAP STEEL FLOWING

through your regular channels

IT'S VITAL IN OUR DEFENSE PROGRAM

STEEL SCRAP IS VITAL TO OUR DEFENSE PROGRAM BE SURE YOU KEEP IT FLOWING ★

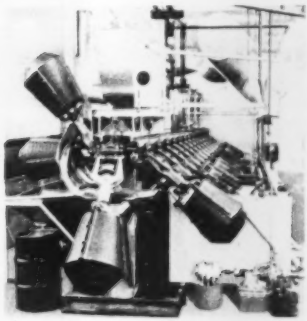
WYCKOFF STEEL COMPANY

motor that is pushbutton controlled, with adjustable limit switch control. Control permits tilt of 135 degrees in 22½ seconds; range of elevation is 24 inches and takes 15 seconds to travel that distance. Maximum load capacity is 6000 pounds regardless of shape.

Check No. 8 on Reply Card for more Details

Automatic Plating Machine

Development of a fully automatic barrel plating and processing machine, model E, is announced by Frederic B. Stevens Inc., 1800-20 18th St., Detroit 20, Mich. The machine is a larger version of the company's previous model C. It supplements the



. . . meets demand for volume plating

smaller model in installations where requirements demand volume plating and processing.

Basically, this plater consists of a continuous rotating barrel-type machine, revolving barrels continuously through the entire cleaning, plating, rinsing and drying cycle. The only manual process required is that of loading barrels at the beginning of the plating cycle and even this can be eliminated through use of a mechanical loader offered by the company as auxiliary equipment. The unit is not standard size; models can be ordered in any size within practical economic limits.

Check No. 9 on Reply Card for more Details

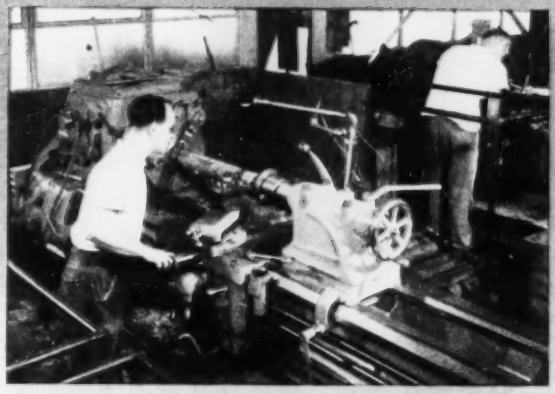
Pallet Stacker Improved

Improved Multi-Stak pallet stacker unit is announced by Elizabeth Iron Works Inc., Box 360, Elizabeth B. N. J. The unit is an all-steel pallet with collapsible stacking attachment used for safe tiering of crushable, irregular, odd-shaped or mixed merchandise. Among the innovations made by the company is a self-contained locking device for vertical rigidity of the standards. Standards' ends nest over raised locating stops on the stringers to assure positive

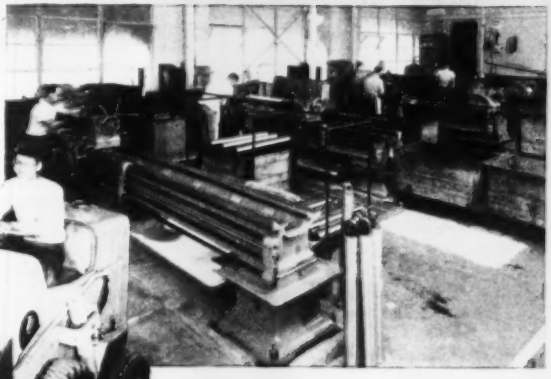
SPRINGFIELD LATHES

on the PAYLOADER

Years of experience in applying engine lathes to the production of various parts for the world-famous **PAYLOADER** have convinced The Frank G. Hough Co., Libertyville, Ill., SPRINGFIELD LATHES are completely satisfactory, extremely versatile and productive.



On the basis of actual records of their installations, operator preference, maintenance cost and production study, The Frank G. Hough Co. have placed repeat order after repeat order with SPRINGFIELD.



Benefit from the advanced design, sturdy reliability and production capacity of SPRINGFIELD Lathes.

Ask for Catalogs.

THE SPRINGFIELD MACHINE TOOL COMPANY

SPRINGFIELD, OHIO, U. S. A.

GENERAL DISTRIBUTORS: BRYANT MACHINERY & ENGINEERING COMPANY, 400 WEST MADISON ST., CHICAGO 6

Exclusive Representatives in All Principal Cities

Dissociating Ammonia to Get Hydrogen?

CUT DOWN ON SHUTDOWNS FOR CATALYST CLEANING

use Du Pont "NATIONAL"*

Anhydrous Ammonia

IN CYLINDERS

You can't buy purer ammonia than Du Pont "National" Anhydrous Ammonia in cylinders . . . never less than 99.99% ammonia. It's always uniform, always dependable, always dry—the moisture content less than 50 parts per million. In producing hydrogen you don't have the problem of frequent shutdowns for cleaning your catalyst to remove carbon deposits caused by oil.

And Du Pont "National" goes a long way . . . one 150-lb. cylinder dissociated gives you the equivalent of 25½ cylinders of hydrogen. To serve you quickly, there are distributors and stock points conveniently located across the country. E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Dept., Wilmington 98, Del.

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*REG. U. S. PAT. OFF.

Do you know these other Du Pont chemicals for metal treating?

HYDROXYACETIC ACID 70%

For bright dipping of copper, electro-polishing of stainless steel and electroless plating of nickel.

METHANOL

Source of hydrogen and carbon monoxide for an efficient reducing atmosphere in many metallurgical operations, and for the cleaning of metal parts during fabrication.

For product information on these and other chemicals, please write on your letterhead.

DU PONT

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BETTER THINGS FOR BETTER LIVING

. . . THROUGH CHEMISTRY

Polychemicals

DEPARTMENT

CHEMICALS • PLASTICS

locking in the upright position.

Greater rigidity of stringers is brought about through addition of corner supports welded to horizontal and vertical ends of stringers. Non-slip checkered steel plate leading edges are introduced in the deck pallet surface. When in use, bearing safety plates at tops of standards in setup positions secure the units, placed one above the other but never allowing weight to rest on merchandise.

Check No. 10 on Reply Card for more Details

Table Mount Improved

Improvement in the mounting of saw tables on the contour machine line is announced by DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill. The design change increases rigidity, minimizes deflection under load and eliminates vibration of the work table while maintaining universal two-way tilt for angle cutting. It also makes possible raising the lower saw guides above the work table surface to give increased support to the blade. The latter change is important when an auxiliary table is used, so the lower guide can be brought up close to the work.

Redesigned mount employs a semi-steel cradle 5½ inches wide bolted and doweled to the steel frame of the machine. A locking nut and rachet-type locking lever permit secure table setting at any angle up to 45 degrees right and 10 degrees left. The movable trunnion is graduated in degrees with an indicator that permits exact table setup before placing the work on the table.

Check No. 11 on Reply Card for more Details

Gas Cutting Machine

Addition of a pantograph-type cutter, the Airco 50 Travograph, to its line of gas cutting machines is announced by Air Reduction Co., 60 E. 42nd St., New York 7, N. Y. Cutter is guided by manual, magnetic or electric tracer and cuts an unlimited variety of shapes from steel plates, slabs, billets and forgings. Its use is equally practicable and economical in cutting either one or a few parts or identical parts on a quantity production basis.

Cutter is all-welded, heavy gage steel construction; has a rigid rail assembly made of rolled tracks with accurately machined surfaces to provide a smooth runway for the carriage. Ball bearings in the pantograph arm hinges and operating bar result in smooth, accurate response to the movement of the tracer. Carriage drive motor unit is self-contained and provides stepless, accur-

Shape of things to come...

From Your Blueprint . . . to Your Product

OSTUCO TUBING

Tapering • Swaging • Flanging • Bending
Upsetting • Expanding • Reducing • Beading
End closing • Spinning • Drilling • Slotting
Notching • Flattening • Shaping • Trimming
Threading • Angle Cutting • And Many Others

Products for the future take shape on the drawing boards of today. And scores of manufacturers are planning ahead for the time when emphasis will again be on production of consumer goods.

In shaping your products to meet tomorrow's demands, consider OSTUCO Steel Tubing. It offers so many outstanding advantages . . . so many unusual opportunities for design improvements, increasing strength while reducing weight, enhancing beauty, and lowering production costs.

Because of the continuing needs of the military services, we cannot always promise early delivery estimates on new civilian orders. However, our experienced tubing engineers are at your service now to help give your product a future with OSTUCO Steel Tubing.

THE OHIO SEAMLESS TUBE COMPANY

Manufacturers and Fabricators of Seamless and Electric Welded Steel Tubing
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SALES OFFICES: BIRMINGHAM, P. O. Box 2021 • CHICAGO, Civic Opera Bldg., 20 N. Wacker Dr. • CLEVELAND, 1328 Citizens Bldg. • DAYTON, 511 Salem Ave. • DETROIT, 520 W. Eight Mile Road, Ferndale • HOUSTON, 6833 Avenue W, Central Park • LOS ANGELES, Suite 300-170 So. Beverly Drive, Beverly Hills • MOLINE, 617 15th St. • NEW YORK, 70 East 45th St. • PHILADELPHIA, 1613 Packard Bldg., 15th & Chestnut • PITTSBURGH, 1206 Pinewood Drive • ST. LOUIS, 1230 North Main St. • SEATTLE, 3104 Smith Tower • SYRACUSE, 501 Roberts Ave. • TULSA, 733 Kennedy Bldg. • WICHITA, 622 E. Third St. • **CANADIAN REPRESENTATIVE:** RAILWAY & POWER CORP., LTD.

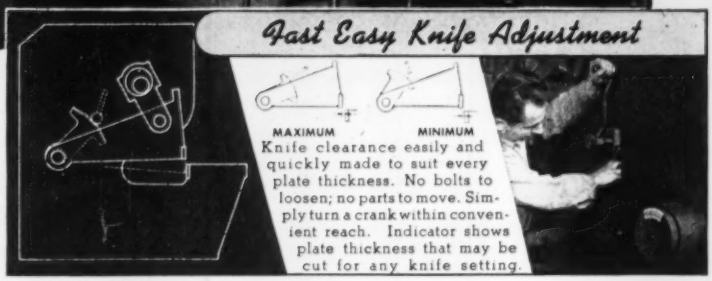
NO PRODUCTION DELAYS

when changing knife clearance on

STEELWELD SHEARS

CUTS 3/4"x10'-0"

This machine cuts plate to ¾" x 10'-0". Other Steelweld Shears available for shearing all thicknesses to 1½" and for lengths to 18'-0". Note the electric foot switch for operating shear — one of many Steelweld production-speeding features.


Fast Easy Knife Adjustment
MAXIMUM
MINIMUM
Knife clearance easily and quickly made to suit every plate thickness. No bolts to loosen; no parts to move. Simply turn a crank within convenient reach. Indicator shows plate thickness that may be cut for any knife setting.

Not hours, not minutes, but seconds — and only a few of them — is all it takes to change the knife clearance on Steelweld Shears.

Shear users, experienced with various makes, are always amazed at the speed, simplicity and accuracy of Steelweld's Micro-Set Knife Adjustment. This feature has strong appeal because they know the importance of having proper knife clearance for the thickness metal being worked on to secure the best possible cuts. They know, too, that with other shears it usually is a major operation to change knife clearance and for that reason is not always done.

Because knife adjustments are made so easily on Steelweld Shears, this becomes a natural step in the working routine of Steelweld operators. It is performed quickly, efficiently, without affecting production. There is no danger of accidental damage. And remember, PROPERLY SET KNIVES REMAIN SHARPER LONGER.

Steelweld Shears are modern heavy duty machines in a class by themselves with a host of features heretofore unavailable. Get the facts and check over the many advantages they offer you.

GET THIS BOOK!

CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

7820 EAST 282nd STREET, WICKLIFFE, OHIO

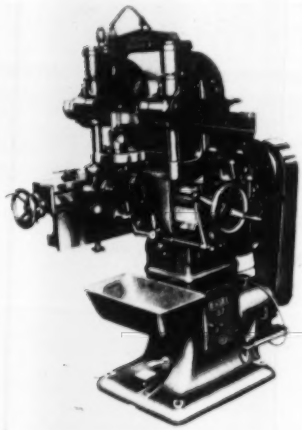
STEELWELD PIVOTED BLADE SHEARS

ate variation in carriage speeds from 2 to 168 inches per minute.

Check No. 12 on Reply Card for more Details

Shaper Machines from Solids

British Industries Corp., 164 Duane St., New York 13, N. Y., is introducing for U. S. distribution the Essex punch shaper made by E. H. Jones Co., London, England. Shaper machines a blanking punch, hob or pro-



. . . eliminates special plates

filed part direct from the solid, using simple tools and eliminating the necessity for making special punch holders or plates. In a majority of applications, punches can be finished completely on the machine.

Stroke of the ordinary shaping tool used is like that of a conventional shaper set vertically, adjustable from $1\frac{1}{2}$ to $4\frac{1}{4}$ inches. However, when predetermined straight stroke is completed, rocker arm operates in a swivel motion finishing off the desired radius.

While the machine's primary application is in punch manufacture, it can also be used successfully for manufacture of various profile parts in small quantities.

Check No. 13 on Reply Card for more Details

Controls Simplify Operation

Simplified pressure control mechanism for use with Marform equipment is a development of Loewy Construction Co. Inc., 216 E. 49th St., New York 17, N. Y. Mechanism consists of a flexible strip cam, readily adjustable by turning friction locking adjustment knobs. In addition to pressure control, setting of three sliding indicators determines upper and

The grinding department has them stepping!

SIMONDS ABRASIVE CO.

Grinding Wheels

More assemblers needed . . . and it's simply a matter of cause and effect. The cause—Simonds Abrasive Company Grinding Wheels! The effect—more production turned out faster. Put more "prod" in *your* production with Simonds Wheels. They're part of a complete line—including grinding wheels of all shapes and sizes, mounted wheels and points, segments and abrasive grains . . . accurately specified for your jobs . . . and made by Simonds Abrasive Company, a major grinding wheel producer for almost 60 years. Write for grinding data book and name of your distributor.

SIMONDS ABRASIVE CO., PHILADELPHIA 37, PA. BRANCH WAREHOUSES: CHICAGO, DETROIT, BOSTON
DISTRIBUTORS IN PRINCIPAL CITIES

Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y., Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

HALLDEN
Automatic Shears

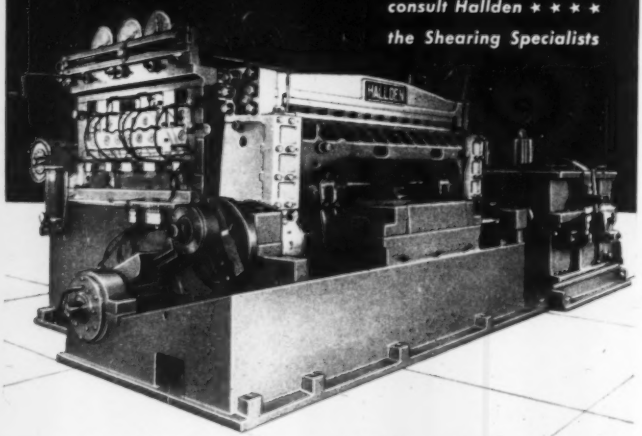
★ FLEXIBLE DESIGN

★ CUTTING ACCURACY

★ CONTINUOUS FEED

★ RUGGED CONSTRUCTION

consult Hallden ★ ★ ★ ★
the Shearing Specialists

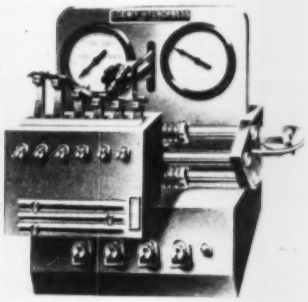


THE HALLDEN MACHINE COMPANY
THOMASTON, CONNECTICUT

Sales Representatives
The Wean Engineering Co., Inc., Warren, O. T. E. Dodds, Pittsburgh, Pa.
W. H. A. Robertson & Co., Ltd., Bedford, England

lower limits of draw depth and point of build-up for intense forming pressure. Emergency and manual control buttons and pressure gages indicating system oil and accumulator pressures are also included on the panel.

Controls are adjustable by setting calibrated rods to predetermined posi-



. . . rods control adjustment

tions. Once the controls are set, operation is fully automatic and operator's work is reduced to placing a blank in the machine, pushing a single button and removing drawn part that is automatica'ly stripped from the punch.

Check No. 14 on Reply Card for more Details

Load Releasing Tubular Tools

Multilift Magnetools, offered by Multifinish Mfg. Co., Detroit 7, Mich., are used for entering small openings such as blind holes and removing boring chips from castings. The magnets are specially designed to remove steel chips or parts from other steel surfaces, chips from metal cutting machines, etc. Available in five models, the hand operated tools are permanent and not electric.

Check No. 15 on Reply Card for more Details

Drill Equipped with Chuck

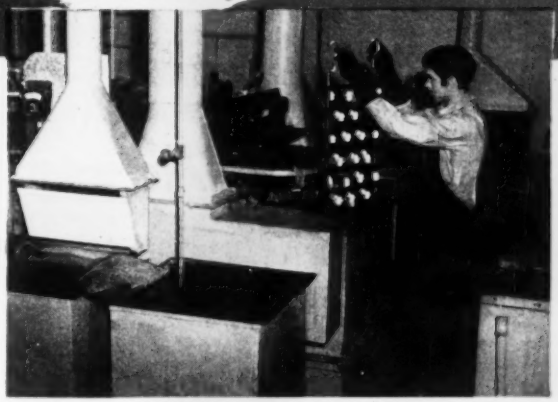
Model 115 drill is equipped with a $\frac{3}{8}$-inch chuck and a swivel ball side handle for two-handed operation. Made by Cummins Portable Tools, Chicago 40, Ill., it has a recommended capacity of $\frac{3}{8}$-inch in metal and $\frac{3}{4}$-inch in hard wood.

Check No. 16 on Reply Card for more Details

Absorber Changer Attachment

Automatic absorber changer attachment consisting of a slide and switch assembly and a set of 25 calibrated aluminum absorbers has been developed by Tracerlab Inc., Boston 10, Mass., for use with their automatic sample changer. Slide assembly mounts in the manual sample

SCINTILLA MAGNETO DIVISION OF BENDIX AVIATION CORPORATION USES UDYLITE EQUIPMENT AND PROCESSES TO SAFEGUARD VITAL AIRCRAFT IGNITION PARTS



Udylite plating installation at Scintilla Magneto Division of Bendix Aviation Corporation showing ignition connectors of the Lockheed F-90 Fighter being processed.

Spark of life to military aircraft—both jet and propeller driven—is the electrical system. Failure can be fatal, so the Scintilla Magneto Division gives the metal of ignition connectors a protective coating against rust and corrosion with Udylite plating equipment and processes.

Here you have an example of how Udylite is helping beat the ploughshares of peace into the swords of war. In defense weapons, ranging from side arms to submarines, you'll find that Udylite precision-plating is making an important contribution to national defense.

If you have a defense job that involves metal finishing, your Udylite Technical Man can lend you the experience gained in World War II when Udylite developed new machines and methods for bettering the plating of the tools of war. Call him today and state your problems. Or write direct to *The Udylite Corporation, Detroit 11, Michigan.* There's no obligation.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

PIONEER OF A BETTER WAY IN PLATING

changer and allows automatic sample changer to position 25 absorbers over a source, making it possible to obtain absorption curves automatically.

Check No. 17 on Reply Card for more Details

Portable Air Drills

A series of small, lightweight portable air drills is announced by Ingersoll-Rand Co., New York, N. Y. Features include one piece housing, more powerful redesigned five-vane air motor, built in automatic lubricator, advancement in throttle valve design to eliminate air leakage, specially designed muffler to minimize exhaust noise and adjustable exhaust deflector. Known as OA and OB Multi-Vane drills, tools are available in several different speeds for work up to ¼-inch capacity.

Check No. 18 on Reply Card for more Details

Hydraulic Control Valve

A line of heavy duty and lightweight spool and sleeve type control valves is announced by American Industries Co., Bristol, Pa. Valves are capable of actuating two single-acting lifting cylinders and one double-acting cylinder. Control levers can be operated by one hand, independently and simultaneously.

Check No. 19 on Reply Card for more Details

Vise Holds Irregular Objects

De Wilde-Jones Inc., San Francisco 5, Calif., is distributing a Swedish vise that clamps round, tapered or irregular objects. Known as Servo vise, its jaws are designed so that they can be moved in relation to each other and the workpiece can rest on a contact surface underneath. By turning the main screw the locking jaws position themselves and can then be locked to retain their directional position.

Check No. 20 on Reply Card for more Details

Gives Rustproof Surface

Known as Rustshield 2, a phosphatizing compound that changes steel and iron surfaces to rustproof, highly absorbent nonmetallic areas is offered by Octagon Process Inc., Staten Island 1, N. Y. It is applied by rubbing and sliding surfaces of precision parts such as thrust washers, pump pistons, gears, valve roller pins, stems and guides, as well as bearing surfaces of every type.

Check No. 21 on Reply Card for more Details

Molding Compound

Designated as Dryply Pre-Imp, a molding compound developed by Flexfirm Products, El Monte, Calif., is a polyester resin with uniformly distributed fiber content usable in present molding techniques.

Check No. 22 on Reply Card for more Details

Belt Conveyor Idlers

Transall Inc., Birmingham, Ala., offers a complete line of prelubricated belt conveyor idlers that require no further lubrication. A combination of contact sealed, high speed, heavy duty ball bearings and special mounting features work together to exclude foreign material and retain bearing lubricant. Lubricant melts at 376° F and is inhibited against oxidation, emulsification and saponification.

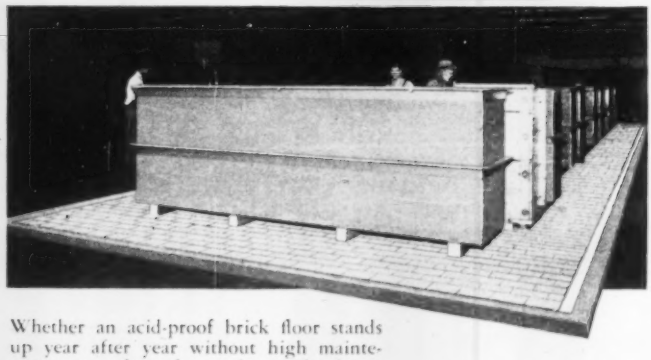
Check No. 23 on Reply Card for more Details

Plastic Asphalt Rock Flooring

Pulverized natural rubber added to an industrial floor material consisting of asphalt rock limestone and cold asphalt emulsion increase life span of floor, reduces brittleness in subfreezing weather and provides better traction when wet. Known as Immediate-Set, the material is suitable for large area floor resurfacing with a relatively thin layer and for patch-

FOR LESS MAINTENANCE OVERHEAD

put Durisite and Brick UNDERFOOT



Whether an acid-proof brick floor stands up year after year without high maintenance costs depends mostly on the joints between the bricks. The thinner the joint the better the chance for long, trouble-free life. But with ordinary bonding mortars you can't get a joint much thinner than ¼".

Durisite *acid-and-alkali-proof* cement, however, bonds brick double-tight with *extra thin* joints . . . ⅛" or less. Not only does Durisite make a thin, strong joint, but it makes a dense, non-absorbent joint.

Durisite is a resin-type cement, sets quickly by internal chemical reaction, is non-toxic, non-explosive, non-inflammable.

U. S. STONEWARE

PROCESS EQUIPMENT DIVISION, AKRON 9, OHIO

FOR A FLOOR YOU CAN INSTALL, AND FORGET, INSIST ON "U.S." TRIPLE-CONSTRUCTION

4" to 6" rigid concrete sub-base

Resilon corrosion-resistant protective membrane

"USSCO" Acid Brick bonded with double-tight Durisite thin joints.

The U. S. Stoneware Co. can supply all necessary materials for installation by your own workmen of a "triple-construction" acid-and-alkali-proof floor, or if you desire, we can handle the entire job, including labor and materials.

How's your "moving" picture?

If you're designing equipment where you must provide for material movement, have you considered the flexibility—economy—efficiency of chains and attachments?

And, if you have, do you realize the possibilities for product improvement, cost reduction in the complete Chain Belt line?

In the complete Chain Belt line there is a size and type of chain . . . the *right* attachment that will exactly fit your requirements. If your machine requires exact, split-second timing, Baldwin-Rex Roller Chain and one of its many standard or special attachments will answer your need.

If split-second timing is not required and low cost is important, perhaps Baldwin-Rex Double Pitch Roller Chain or a Rex Cast Chain is the answer. If corrosion is a problem, a Rex Z-Metal Cast Chain will do the job.

If your problem involves the handling of cans, bottles, jars, or small parts and packages, Rex TableTop® provides an efficient, economical answer. For heavier duty service, Baldwin-Rex Plate Top Chain is an efficient, low cost mover.

For extremely heavy load, heavy-duty service, Rex Chabelco Steel Chains offer a wide range of sizes and types with attachments that provide years of efficient carrying service.

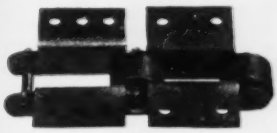
Because the Chain Belt line is complete . . . our Field Sales Engineers can recommend the exact chain that is exactly right for your requirements. You'll find their highly specialized knowledge valuable to you in getting lower costs—improved performance from your equipment.

Call or write your nearest Chain Belt Field Sales Office or mail the coupon for your copy of Bulletin 50-35.

★ *The chain attachments illustrated are just a few of the many standard designs found in the complete Chain Belt line.*

Style E Attachment

Style A Attachment



Style K Attachment

Style A Attachment

Style H Attachment

Style D Attachment

Chain Belt COMPANY of MILWAUKEE

REX CHAIN & TRANSMISSION DIVISION
Milwaukee 4, Wis.

BALDWIN-DUCKWORTH DIVISION
Springfield 2, Mass.

REX ® BALDWIN REX

Chain Belt Company 51-105A
1660 W. Bruce St.,
Milwaukee 4, Wisconsin

Gentlemen:
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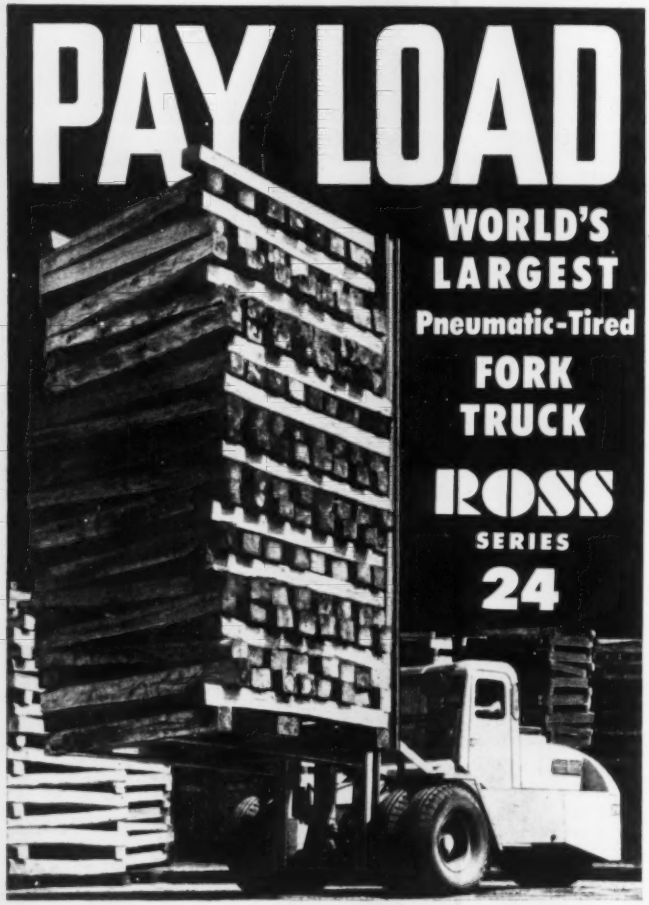
Company.....*Dept.*.....

Address.....

City.....*State*.....



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HUGE 14.00-20 TIRES, PLENTY OF WEIGHT ON DRIVING WHEELS - MINIMUM YARD SURFACING REQUIRED

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ing small damaged areas in interior or exterior locations. It is available from Flash-Stone Co. Inc., Philadelphia 44, Pa.

Check No. 24 on Reply Card for more Details

Maintains Constant Atmosphere

Petroleum Solvents Corp., New York 17, N. Y., has developed Petrocol-A-lll, a fuel system treatment for maintenance of predetermined fuel delivery. Its regular use will provide constant Orsat measurements of oxidizing and reducing gases where variations have been traced to irregular fuel delivery.

Check No. 25 on Reply Card for more Details

Reinforced Plastic Sheet

Machining grade glass fiber reinforced plastic sheet, A3A, is announced by Dynakon Corp., Cleveland 3, O. It is said to have punching and machining qualities similar to brass. Sheet is available in $\frac{1}{8}$, 3/16, and $\frac{1}{4}$-inch thickness. It has a tensile strength of 11,900, compressive strength of 14,300 and impact of 10.3.

Check No. 26 on Reply Card for more Details

Self-Locking Bolt

Slotted-type place bolt, made by National Screw & Mfg. Co., Cleveland 4, O., requires no nuts, washers or other devices to lock against vibration when drawn up against a rigid seat. The cold-headed bolt is reusable, one piece and all metal. It can be made of alloy steel or carbon and is available in a range of American Standard sizes from $\frac{1}{4}$ to 1 inch, in coarse or fine thread pitches.

Check No. 27 on Reply Card for more Details

All Purpose Lubricant

Multiplex lubricant of the Bentone type is available from Hood Refining Co., Greensburg, Pa. Produced in grades from No. 00 to No. 3, it is made with a bodying agent that gives it complete stability under all service and storage conditions. Lubricant has no melting point and retains lubricity and adhesive characteristics under all temperature conditions.

Check No. 28 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Helpful Literature

73. Portable Conveyor

E. W. Buschman Co.—Specification data on motors, belting, wheels, locks, guards, couplings and optional equipment of Trojan portable conveyor-loader-stacker is found in 4-page illustrated bulletin No. 50A. Dimensional chart shows loading and unloading heights for 10, 12, and 19-ft models.

74. Fluid Tracer

Sidney Machine Tool Co.—A precision duplicating attachment for any size or model Sidney lathe called the Fluid Tracer is subject of 8-page descriptive folder which also presents dimensional drawings and specifications. Tracer head transfers changes in contour from master or template to cutting tool.

75. Protective Processes

American Chemical Paint Co.—8-page illustrated form No. 438C is a quick reference list of metal protective and paint bonding chemicals and processes. Information pertains to aluminum, brass, copper and alloys, galvanized iron, zinc, cadmium, iron and steel, magnesium and stainless steel.

76. Chemical Pumps

Allis-Chalmers Mfg. Co. — 6-page illustrated bulletin 52B7638 details construction features of oil-lubricated, pedestal mounted pump for handling chemicals, liquors, corrosive materials and solutions, hot liquids and petroleum. Pumps have capacities to 1200 gpm at heads to 250 ft and temperatures to 500° F.

77. Drills & Tappers

Hamilton Tool Co.—Illustrated bulletin GL-349 gives specifications of sensitive production drilling and tapping machines designed to hold accuracy under any manufacturing conditions. Machines having horizontal work capacities to centers of 6½ to 16 in. and vertical capacities from 3½ to 10 in. are included.

78. Speed Reducers

Abart Gear & Machine Co.—"Abart Speed Reducers and Gearmotors" is title of 96-page pocket-size catalog giving complete engineering data on selecting proper speed reducers to fit various requirements. Horsepower ratings, ratios and installation graphs are included.

79. Tractor-Shovel

Frank G. Hough Co.—Action photos in catalog 208 show how 1¼-cu-yd capacity model HY Payloader tractor shovel serves construction and public works fields in solving material handling problems. Full-reversing transmission, operator visibility, hydraulic bucket control and power booster steering are features shown.

80. Woven Wire Slings

Cambridge Wire Cloth Co.—Illustrated folder describing Gripper woven wire slings is entitled "4 Ways to Simplify Handling of Tubing and Bar Stock in Steel Warehouses." Movement of stock through typical warehouse is shown in flow sheet form.

81. Grinder Wheel Guards

Morrison Products, Inc.—4-page illustrated folder "Why 90% of All Wheel Guards Used on Portable Grinders Are Morrison Made" describes line of guards available and gives features, such as maximum safety, light weight, strength and compliance with ASA safety code.

82. Push-Pull Remote Controls

American Chain & Cable Co., Automotive & Aircraft Div.—12-page illustrated booklet "The Key to Remote Control" shows construction, operating principle and applications of Tru-Lay flexible push-pull controls. These units provide accurate means of transferring push-pull movements from one location to another.

83. Induction Heating

Westinghouse Electric Corp.—12-page pamphlet B-4782 offers illustrations and case histories of various manufacturers using induction heating equipment for hardening, joining, annealing or heating metals. Among machines described are the horizontal scanner, vertical scanner, Inductall gear-hardening machine and motor generators.

84. Industrial Trucks

Elwell-Parker Electric Co. — 12-page illustrated condensed catalog lists capacities and dimensional specifications for power industrial trucks. It is divided into four sections: high lift and low lift platform trucks, fork trucks and mobile cranes.

85. Electroplating Equipment

Hanson-Van Winkle-Munning Co.—Electroplating items such as rubber gloves, Koroseal aprons, carboy pouring spout, acid pumps, earthenware crocks, rubber pails, Tygon paint, H-VW-M oxidizing liquid, acid pitchers, burnishing shot and burnishing balls are covered in bulletin M-100.

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86. Military Packaging

Mehl Mfg. Co.—36-page pocket-size "Military Packaging Guide" outlines government, Army, Navy and Air Force packaging specifications involving flexible protective barriers against weather, water, mildew and corrosion. More than thirty such specifications are mentioned, cross-indexed and illustrated.

87. Rust Preventive

Nox-Rust Chemical Corp. — Wall chart No. 451 measuring 17 x 22 in. lists uses, minimum protection time, application and removal and physical description of Nox-Rust protective coatings for metal parts and machinery. Preservatives meeting Federal and military specifications are presented.

88. Equipment Rebuilding

BFM Industries Inc.—Using photo-narrative style, bulletin entitled "Facts" takes reader on typical problem tour of plant and describes methods used to tear down diesels, generators and motors; redesign them; or rebuild them for special needs. Remodeling and rebuilding, machining and testing, electrical fabrication and other departments are covered.

89. Milling Attachments

Portage Machine Co. — Nonpower feed rotary table and angular milling attachment for use on No. 4 horizontal boring, drilling and milling machine are described in two illustrated data sheets.

90. Wire Straightener

Mettler Machine Tool, Inc.—Single page illustrated data sheet describes Shuster motor driven rotary wire straightener in sizes for wire diameters up to 3/16-in.

91. Materials Handling

Clark Equipment Co., Industrial Truck Div.—"Basic Facts About Materials Handling" is 24-page illustrated guide to efficient handling of raw and finished materials, their proper storage, and selection and operation of industrial power trucks. Details are given on power truck attachments which simplify product handling operations.

92. Optical Comparators

Jones & Lamson Machine Co.—"Optical Comparator" catalog No. 402 covers company's complete line of optical comparators for precision measuring and checking of parts.

93. Alloy Cast Irons

International Nickel Co.—36-page illustrated technical bulletin "Nickel Alloyed Cast Irons" deals with engineering properties and applications of Ni-Resist. Eight types of austenitic nickel alloy cast irons provide resistance to corrosion, heat, wear and low temperatures. High or low controlled expansion, magnetic or nonmagnetic properties, and resistance to thermal shock add to alloy's usefulness.

94. Tool Bits

DoALL Co. — Molybdenum, tungsten and cobalt high speed steel tool bits in wide range of sizes are covered in 4-page illustrated bulletin 51-805. Included are recommendations for proper use, finishes, heat treatment and correct grinding.

95. Power Conversion Units

General Electric Co.—Features of metallic rectifier power conversion unit and its application and operation are included in 8-page illustrated bulletin GEA-5658. Line drawings and charts show efficiency and regulation curves for various sized units.

96. Welding Alloys Chart

Eutectic Welding Alloys Corp. — Specifications for almost 200 metal-joining alloys, plus bonding temperatures, tensile strengths and recommended uses, are included in 10 x 14-in. wall chart of Eutectic low temperature welding alloys. Listings show proper alloys for use with various metals.

97. Roof Ventilators

Iron Lung Ventilator Co.—Ratings of Iron Lung power roof ventilating units are given in 8-page illustrated brochure No. 40. Sizes from 20 to 60 in. have capacities from 3270 to 40,000 cfm.

98. Remote Controls

Teleflex, Inc.—Remote controls for aircraft, automotive, industrial and marine uses are the subject of 4-page illustrated folder No. 300. A typical control system is diagrammed, applications listed and general description is given.

99. Auger Bits

Midway Tool Co.—Included in descriptive bulletin are Mirbrite mirror bright bits for hand braces which are available in 17 sizes from ½ to 1½ in. Also listed are five, six and thirteen-piece sets and other tools.

100. Stamping Lubricants

Forbex Corp.—Bulletin No. 10-16 describes Ten series of drawing and stamping lubricants made for severe drawing, forming, stamping, cutting and piercing of stainless steel and other hard metals. They possess clinging and heat resistant qualities and will not separate or go rancid.

FOR MORE INFORMATION USE ONE OF THESE CARDS . .

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11	31	51	71	91
12	32	52	72	92
13	33	53	73	93
14	34	54	74	94
15	35	55	75	95
16	36	56	76	96
17	37	57	77	97
18	38	58	78	98
19	39	59	79	99
20	40	60	80	100

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THIS latest Dings magnet has *all* the features necessary for maximum scrap yard performance. A few examples . . .

WELDED STEEL CONSTRUCTION—eliminates the moisture danger, makes a strong rigid magnet that can take the hard blows.

LIGHTER WEIGHT—*More* of the weight your crane is carrying will be payload. A balanced magnetic circuit of advanced design makes this difference.

MAXIMUM POWER, LONGER—No. 1 reason for this is less heat rise due to the improved magnetic circuit. In addition, a new, finer insulating compound dissipates strength-sapping heat, prevents electrical leakage between coil wires.

Those are the *big* new features. There are a dozen other important ones you'll be interested in.

FOR FULL DETAILS, WRITE for the LIFTING MAGNET CATALOG.

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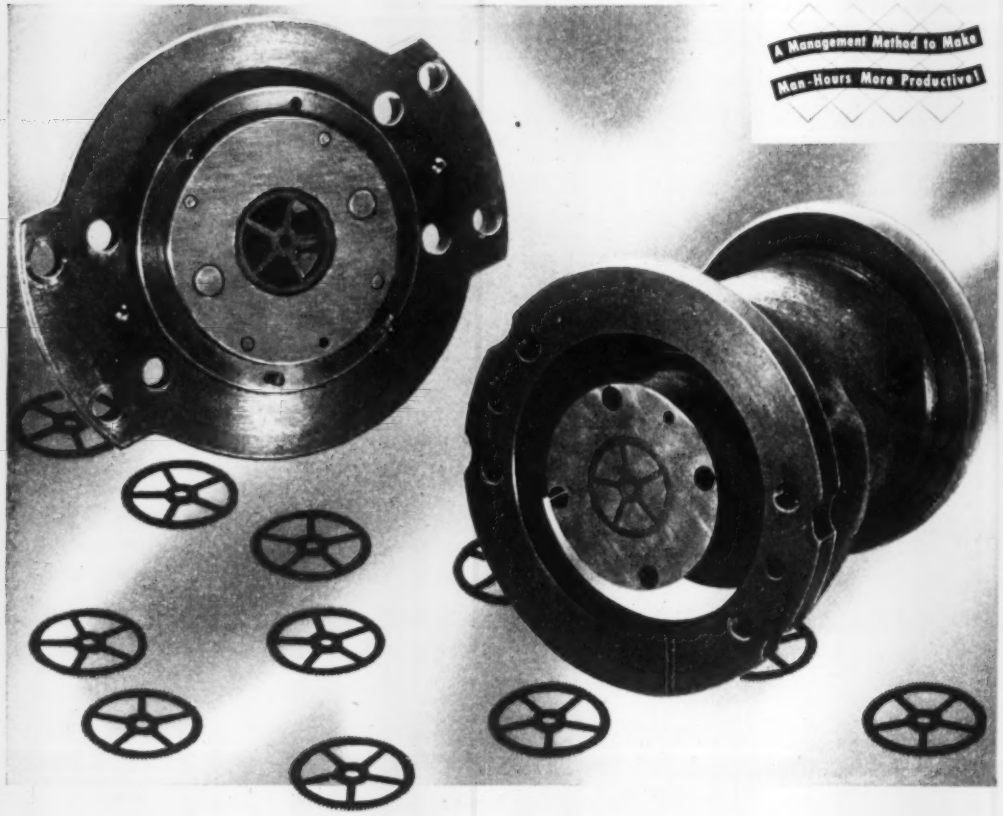


Why Not Gear Up For Today's Production *This Way?*

For 11 years this Stentor blanking die and punch gave trouble-free performance, averaging 100,000 gears per grind. This record enabled management and production to avoid production delays by keeping machines operating with fewer shut-downs for resharpening. The precision gears, 120 teeth 90 pitch, are made from 24 ga., ¼-hard brass. In heat treatment the die moved only .0005" on the maximum diameter of the gear.

It wasn't a happy coincidence that the tool and die steel was perfectly suited to put production from the tools on a smooth, trouble-free basis. It was planned that way—with the help of the Carpenter Matched Set Method. For the Method not only enabled this plant to eliminate costly experimentation in selecting the right steel, but enabled management to forecast output in advance because they could count on the tools to produce the parts *on time*.

Used in hundreds of plants, the Method offers far more than simplified tool steel selection. It makes machine operators more productive. It enables your plant to carry lower tool steel inventories. It makes heat treating easier, simplifies tool-room and production procedures. What's more, it is amazingly easy to apply. No extra cost or bother. To discover what it can do for you, ask for the new booklet "How to Get Better Tool and Die Performance". THE CARPENTER STEEL CO., 139 W. Bern St., Reading, Pa.

Export Department: The Carpenter Steel Company, Reading, Pa. "CARSTEELCO".

Carpenter

MATCHED TOOL & DIE STEELS

More than top-grade steels . . . a Method to keep tooling and production on schedule!

For your convenience, Carpenter carries warehouse stocks in principal cities throughout the country.

The Market Outlook

STEEL allotments for first quarter generally will be smaller. Tonnage grants for the period are appearing as the National Production Authority completes screening consumer applications. And allotments so far, for the most part, are below the volume requested. This is especially true in plates, bars and shapes. Freight car and shipbuilding are among defense-support production lines that appear to have received cutbacks. Further reductions in supplies for civilian goods also are indicated. On the other hand, stepping up of allocations for combat tanks, aircraft, guns, atomic energy and electronic requirements, and certain other prime military programs is seen.

BALANCE—Better balance between steel supply and demand is likely in first quarter. Supplies will be no more plentiful, but steelmakers say more realistic allotting by NPA encourages hope for increased orderliness in distribution under the Controlled Materials Plan. No sharp change in supply is looked for over rest of the current quarter. Cancellations as result of NPA's regulation ordering consumers to charge third-quarter carryover tonnage against their fourth-quarter allotments have not been heavy. Most of the cancellations to date appear to be in sheets, largely reflecting slowing down in consummer durable goods.

PRODUCTS—Government restrictions on building are holding down structural steel awards. Fabricators are more concerned with getting steel for approved work on their books than they are over limitations on new business. Cutbacks in the ship building program may release some plate tonnage earmarked for December rolling. It is not likely to satisfy more than a small percentage of unplaced business. Bar producers had substantial carryover from third quarter and expect an overflow into first quarter. The railroads are placing 1952 rail requirements, the Pennsylvania railroad last week ordering 100,000 tons, divided among three producers. Sheets are under somewhat less pressure. Cutbacks in civilian goods are resulting in some order cancellations.

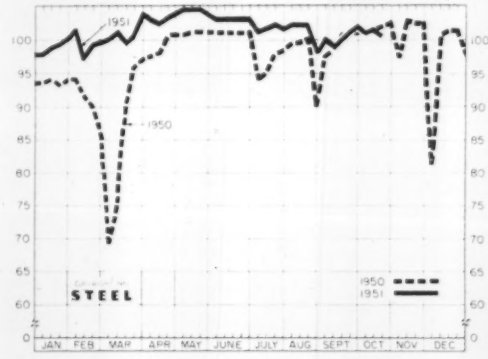
PRODUCTION—Steelmaking operations declined 1 point last week to 100.5 per cent of capacity due to labor difficulties and scrap shortage. Strikes at one Chicago district works and at another in Youngstown were settled but a wildcat strike closed the Indiana Harbor Works of Inland Steel Co. and Youngstown Sheet & Tube Co. at midweek encountered new labor difficulties. In the week ended Oct. 13, strike at the South Works of United States Steel Co. caused loss of 55,000 tons of ingots. Inland is losing 10,800 tons a day.

SCRAP—The shortage of scrap presents an increasingly serious threat to continued high-level steel operations. Some encouraging results are reported from the collection drives under way, but overall supplies still are not gaining. In fact, some steelworks are operating on virtually day-to-day inventory. Unless substantial increase in the flow of material is experienced in the weeks immediately ahead, steelmakers say severe curtailment in open-hearth operations is inevitable.

PRICES—Upward revision in galvanized steel product prices to offset the recent 2 cents per pound increase in the price of zinc has been delayed temporarily. OPS appears to question the regularity of the formula under which such prices automatically rise. Expectations are the advances will be allowed no later than Nov. 1. Minor modifications have been made in the government ceiling price schedule for scrap, but the trade is disappointed over failure of the OPS to establish a uniform price for steelmaking grades. This is said to be still under consideration.

COMPOSITES—STEEL's weighted index on finished steel holds at 171.92 as does the arithmetical composite at $106.32. Pig iron is steady with No. 2 foundry grade $52.54, basic, $52.16, and malleable, $53.27. Steelmaking scrap composite is firm at $44.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Oct. 20	Change	Same Week 1950	Same Week 1949
Pittsburgh	100.5	+ 0.5*	105	3.5
Chicago	92.5	−3.5*	102.5	5.5
Mid-Atlantic	99	0	99	8.5
Youngstown	103	+ 9	106	0
Wheeling	101.5	+ 0.5	97	61
Cleveland	100.5	+ 1*	100	0
Buffalo	104	0	104	0
Birmingham	102	— 2	100	6
New England	85	—10	89	55
Cincinnati	104	+ 3	106	52
St. Louis	98	+ 3	95	84.5
Detroit	101.5	0	106	37
Western	106	+ 3	100	21
Estimated national rate	100.5	— 1	102	9.5

Based on weekly steelmaking capacity of 1,969,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950; 1,843,516 tons for 1949.

*Change from revised rate for preceding week.

The Metalworking Outlook—p. 33 Production-Engineering News—p. 69

Composite Market Averages

FINISHED STEEL INDEX, Weighted:

	Oct. 18 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.—100)	171.92	171.92	171.92	157.62	112.04
Index in cents per lb.	4.657	4.657	4.657	4.270	3.035

ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$106.32	$106.32	$106.32	$95.00	$64.45
No. 2 Fdry. Pig Iron, GT	52.54	52.54	52.54	49.35	28.17
Basic Pig Iron, GT	52.16	52.16	52.16	48.10	27.50
Malleable Pig Iron, GT	53.27	53.27	53.27	49.63	28.79
Steelmaking Scrap, GT	44.00	44.00	44.00	41.50	19.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 respresentative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Oct. 18 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.45	2.50
Bars, H.R., Chicago	3.70	3.70	3.70	3.45	2.50
Bars, H.R., del. Philadelphia	4.223	4.223	4.223	3.93	2.86
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.15	3.10
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.40	2.35
Shapes, Std., Chicago	3.65	3.65	3.65	3.40	2.35
Shapes, del. Philadelphia	3.918	3.918	3.918	3.46	2.48
Plates, Pittsburgh	3.70	3.70	3.70	3.50	2.50
Plates, Chicago	3.70	3.70	3.70	3.50	2.50
Plates, Coatesville, Pa.	4.15	4.15	4.15	3.90	2.50
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.50	2.50
Plates, Claymont, Del.	4.15	4.15	4.15	3.90	2.50
Sheets, H.R., Pittsburgh	3.60-75	3.60-75	3.60-75	3.35	2.425
Sheets, H.R., Chicago	3.60	3.60	3.60	3.35	2.425
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Chicago	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Detroit	4.55	4.55	4.55	4.30	3.375
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.40	4.05
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.50-3.75	2.35
Strip, H.R., Chicago	3.50	3.50	3.50	3.25	2.35
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.15-4.50	3.05
Strip, C.R., Chicago	4.90	4.90	4.90	4.30	3.15
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.35-4.95	3.15
Wire, Basic, Pittsburgh	4.85-5.10	4.85-5.10	4.85-5.10	4.50-4.75	3.05
Nails, Wire, Pittsburgh	5.90-6.20	5.90-6.20	5.90-6.20	5.30-5.60	3.75
Tin plate, box, Pittsburgh	$8.70	$8.70	$8.70	$7.50	$5.25

SEMIFINISHED

Billets, forging, Pitts (NT)	$66.00	$66.00	$66.00	$63.00	$47.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$", Pitts.	4.10-30	4.10-30	4.10-30	3.85	2.30

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$47-$50	$29.00
Basic, Valley	52.00	52.00	52.00	46-49	28.00
Basic, del. Phila.	56.61	56.61	56.61	51.44	29.93
No. 2 Fdry, Pitts.	52.50	52.50	52.50	49.50	28.50
No. 2 Fdry, Chicago	52.50	52.50	52.50	49.50	28.50
No. 2 Fdry, Valley	52.50	52.50	52.50	49.50	28.50
No. 2 Fdry, Del. Phila.	57.11	57.11	57.11	51.94	30.43
No. 2 Fdry, Birm.	48.88	48.88	48.88	45.88	24.88
No. 2 Fdry (Birm.) del. Cin.	55.49	55.49	55.49	52.58	28.94
Malleable Valley	52.50	52.50	52.50	49.50	28.50
Malleable, Chicago	52.50	52.50	52.50	46.50-49.50	28.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	62.00	33.00
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	175.00	140.00*

* Delivered Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt, Pitts.	$45.00	$45.00	$45.00	$44.00	$20.00
No. 1 Heavy Melt, E. Pa.	45.50	45.50	45.50	46.50	18.75
No. 1 Heavy Melt, Chicago	43.50	43.50	43.50	40.00	18.75
No. 1 Heavy Melt, Valley	45.00	45.00	46.00	43.75	20.00
No. 1 Heavy Melt, Cleve.	44.00	44.00	44.00	43.25	19.50
No. 1 Heavy Melt, Buffalo	44.00	44.00	44.00	41.50	19.25
Rails, Rerolling, Chicago	52.50	52.50	52.50	51.50	22.25
No. 1 Cast, Chicago*	49.00	49.00	49.00	55.50	20.00

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn. Connlsvl.	$14.75	$14.75	$14.75	$14.25	$8.75
Beehive, Fdry., Connlsvl.	17.50	17.50	17.50	16.50	9.50
Oven, Fdry., Chicago	23.00	23.00	23.00	21.00	14.35

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	24.50	14.375
Zinc, E. St. Louis	19.50	19.50	17.50	17.50	8.25
Lead, St. Louis	18.80	18.80	16.80	15.80	8.10
Tin, New York	103.00	103.00	103.00	113.00	52.00
Aluminum, del.	19.00	19.00	19.00	19.00	15.00
Antimony, Laredo, Tex.	42.00	42.00	42.00	32.00	14.50
Nickel, refinery, duty paid	56.50	56.50	56.50	48.00	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn,N.Y., del.	....	59.18	59.68	....
Newark,del.	56.87	57.37	57.87	58.37
Philadelphia, del.	56.61	57.11	57.61	58.11
Birmingham District				
Alabama City,Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S9	48.38	48.88	....	....
Woodward,Ala. W15	48.38	48.88	....	....
Cincinnati, del.	....	55.49	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda,N.Y. W12	52.00	52.50	53.00	....
No.Tonawanda,N.Y. T9	....	52.50	53.00	....
Boston, del.	62.11	62.61	63.11	....
Rochester,N.Y., del.	54.88†	55.38†	55.88†	....
Syracuse,N.Y., del.	55.91†	56.41†	56.91†	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary,Ind. U5	52.00	....	52.50	....
Indiana Harbor,Ind. I-2	52.00	....	52.50	....
So.Chicago,Ill. W14	52.00	52.50	52.50	....
So.Chicago,Ill. Y1	52.00	52.50	52.50	....
So.Chicago,Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	54.06	54.56	54.56	55.06
Muskegon,Mich., del.	....	58.47	58.47	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron,O., del. from Cleve.	54.61	55.11	55.11	55.61
Lorain,O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie,Pa. I-3	52.00	52.50	52.50	53.00
Everett,Mass. E1	....	57.00	57.50	....
Fontana,Calif. K1	58.00	58.50	....	....
Geneva,Utah G1	52.00	52.50	....	....
Seattle,Tacoma,Wash., del.	....	60.66	....	....
Portland,Oreg., del.	....	60.66	....	....
LosAngeles,SanFrancisco, del.	60.16	60.66	....	....
GraniteCity,Ill. G4	53.90	54.40	54.90	....
St.Louis, del. (inc. tax)	54.66	55.16	55.66	....
Ironton,Utah C11	52.00	52.50	....	....
LoneStar,Tex. L6	48.00	*48.50	48.50	....
Minnequa,Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
Neville Island,Pa. P6	....	52.50	52.50	53.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.	....	53.80	53.80	54.30
McKeesRocks, del.	....	53.54	53.54	54.04
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	54.07	54.07	54.57
Verona, del.	....	54.57	54.57	55.07
Brackenridge, del.	....	54.82	54.82	55.32
Bessemer,Pa. U5	52.00	....	52.50	53.00
Clairton,Rankin,So.Duquesne,Pa. U5	52.00	....	....	....
McKeesport,Pa. N3	52.00	....	....	53.00
Monessen,Pa. P7	54.00	....	52.50	53.00
Sharpsville,Pa. S6	....	....	....	....
Steelton,Pa. B2	54.00	54.50	55.00	55.50
Sweedeland,Pa. A3	56.00	56.50	57.00	57.50
Toledo,O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97	....	....
Troy,N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard,O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield,O., del.	56.65	57.15	57.15	57.65

* Low phos, southern grade. † Preliminary.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY IRON, Gross Ton

(Base 6.00[6.50% silicon; add $1.50 for each 0.5% Si)

Jackson,O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

Niagara Falls,N.Y. P15	$88.00
Keokuk,Iowa, Openhearth & Fdry. frt. allowed K2	92.50
Keokuk, Off & Fdry., 12% lb pigiets, 16% Si, frt. allowed K2	95.50
Wenatchee,Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles,Tenn. T3	$66.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton,Pa. B2	60.00
Philadelphia delivered	63.37
Troy,N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mills prices quoted under GCPR as reported to STEEL, Oct. 18, 1951; cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ....$79.00
Munhall,Pa. U5 ....52.00

INGOTS, Alloy (NT)
Detroit R7 ....$54.00
Fontana,Calif. K1 ....80.00
Houston,Tex. S5 ....62.00
Midland,Pa. C18 ....54.00
Munhall,Pa. U5 ....54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$56.00
Clairton,Pa. U5 ....56.00
Ensley,Ala. T2 ....56.00
Fairfield,Ala. T2 ....56.00
Fontana,Calif. K1 ....75.00
Gary,Ind. U5 ....56.00
Johnstown,Pa. B2 ....56.00
Lackawanna,N.Y., B2 ....56.00
Munhall,Pa. U5 ....56.00
So.Chicago,Ill. U5 ....56.00
So.Duquesne,Pa. U5 ....56.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$66.00
Buffalo R2 ....66.00
Canton,O. R2 ....66.00
Clairton,Pa. U5 ....66.00
Cleveland R2 ....66.00
Conshohocken,Pa. A3 ..73.00
Detroit R7 ....69.00
Ensley,Ala. T2 ....66.00
Fairfield,Ala. T2 ....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. U5 ....66.00
Geneva,Utah G1 ....66.00
Houston,Tex. S5 ....74.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y. B2 ....66.00
LosAngeles B3 ....85.00
Munhall,Pa. U5 ....66.00
Seattle B3 ....85.00
So.Chicago R2,U5,W14 ..66.00
So.Duquesne,Pa. U5 ....66.00
So.SanFrancisco B3 ....85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$70.00
Buffalo R2 ....70.00
Canton,O. R2 ....70.00
Canton,O.(29) T7 ....66.00
Conshohocken,Pa. A3 ..77.00
Detroit R7 ....73.00
Fontana,Calif. K1 ....89.00
Gary,Ind. U5 ....70.00
Houston,Tex. S5 ....78.00
Ind.Harbor,Ind. Y1 ....70.00
Johnstown,Pa. B2 ....70.00
Lackawanna,N.Y. B2 ....70.00
LosAngeles B3 ....90.00
Massillon,O. R2 ....70.00
Midland,Pa. C18 ....70.00
Munhall,Pa. U5 ....70.00
So.Chicago R2,U5,W14 ..70.00
So.Duquesne,Pa. U5 ....70.00
Struthers,O. Y1 ....70.00
Warren,O. C17 ....70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ....$82.00
Cleveland R2 ....82.00
Fontana,Calif. K1 ....103.00
Gary,Ind. U5 ....82.00
Massillon,O. R2 ....82.00
So.Chicago, Ill. R2 ....82.00
So.Duquesne,Pa. U5 ....82.00

SHEET BARS (NT)
Fontana,Calif. K1 ....$89.00

SKELP
Aliquippa,Pa. J5 ....$3.45
Munhall,Pa. U5 ....3.35
Warren,O. R2 ....3.35
Youngstown, R2, U5 ....3.35

WIRE RODS
Alton,Ill. L1 ....4.40
AlabamaCity,Ala. R2 ....4.10
Buffalo W12 ....4.10
Cleveland A7 ....4.10
Donora,Pa. A7 ....4.10
Fairfield,Ala. T2 ....4.10
Fontana,Calif. K1 ....4.90
Houston,Tex. S5 ....4.50
Johnstown,Pa. B2 ....4.10
Joliet,Ill. A7 ....4.10
LosAngeles B3 ....4.90
Minnequa,Colo. C10 ....4.35
Monessen,Pa. P7 ....4.30
No.Tonawanda,N.Y.B11 ..4.10
Pittsburg,Calif. C11 ....4.75
Portsmouth,O. P12 ....4.30
Roebling,N.J. R5 ....4.20
So.Chicago,Ill. R2 ....4.10
SparrowsPoint,Md. B2 ....4.75
Sterling,Ill.(1) N15 ....4.10
Struthers,O. Y1 ....4.10
Torrance,Calif. C11 ....4.90
Worcester,Mass. A7 ....4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.45
Lackawanna,N.Y. B2 ....4.45
Munhall,Pa. U5 ....4.45
So.Chicago,Ill. U5 ....4.45

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ....3.60
Aliquippa,Pa. J5 ....3.65
Bessemer,Ala. T2 ....3.65
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 ....3.65
Fairfield,Ala. T2 ....3.65
Fontana,Calif. K1 ....4.25
Gary,Ind. U5 ....3.65
Geneva,Utah G1 ....3.65
Houston,Tex. S5 ....4.05
Ind.Harbor,Ind. I-2 ....3.65
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.25
Lackawanna,N.Y. B2 ....3.70
LosAngeles B3 ....4.25
Minnequa,Colo. C10 ....4.10
Munhall,Pa. U5 ....3.65
Niles,Calif.(22) P1 ....4.85
Phoenixville,Pa. P4 ....6.25
Portland,Oreg. O4 ....4.50
Seattle B3 ....4.30
So.Chicago,Ill. U5,W14 ..3.65
So.SanFrancisco B3 ....4.20
Torrance,Calif. C11 ....4.25
Weirton,W.Va. W6 ....3.90

Alloy Stand. Shapes
Clairton,Pa. U5 ....4.35
Fontana,Calif. K1 ....5.55
Munhall,Pa. U5 ....4.35
So.Chicago,Ill. U5 ....4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ....5.50
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa.(114) B2 ..5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.10
Gary,Ind. U5 ....5.50
Geneva,Utah G1 ....5.50
Ind.Harbor,Ind. I-2 ....5.50
Ind.Harbor,Ind. Y1 ....6.00
Johnstown,Pa. B2 ....5.50
Lackawanna,N.Y.(14) B2 5.50
LosAngeles B3 ....6.05
Munhall,Pa. U5 ....5.50
Seattle B3 ....6.10
So.Chicago,Ill. U5 ....5.50
So.SanFrancisco B3 ....6.00
Struthers,O. Y1 ....6.00

Wide Flange
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 ....3.65
Fontana,Calif. K1 ....4.65
Lackawanna,N.Y. B2 ....3.70
Munhall,Pa. U5 ....3.65
So.Chicago,Ill. U5 ....3.65

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ....5.50
Lackawanna,N.Y. B2 ....5.50
Munhall,Pa. U5 ....5.45
So.Chicago,Ill. U5 ....5.45

BEARING PILES
Munhall,Pa. U5 ....3.65
So.Chicago,Ill. U5 ....3.65

PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.65
Bessemer,Ala. T2 ....5.65
Clairton,Pa. U5 ....5.65
Cleveland J5, R2 ....5.65
Conshohocken,Pa. A3 ....5.90
Fairfield,Ala. T2 ....5.65
Fontana,Calif.(30) K1 ....6.25
Gary,Ind. U5 ....5.65
Geneva,Utah G1 ....5.65
Ind.Harbor,Ind. I-2 ....5.65
Ind.Harbor,Ind. Y1 ....6.15
Johnstown,Pa. B2 ....5.65
Munhall,Pa. U5 ....5.65
Pittsburgh J5 ....5.65
Seattle B3 ....6.55
Sharon,Pa. S3 ....5.70
So.Chicago,Ill. U5 ....5.65
SparrowsPoint,Md. B2 ....5.65
Warren,O. R2 ....5.65
Youngstown Y1 ....6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ....4.85
Coatesville,Pa. L7 ....5.25
Conshohocken,Pa. A3 ....5.05
Fontana,Calif. K1 ....5.70
Gary,Ind. U5 ....4.75
Johnstown,Pa. B2 ....4.75
Munhall,Pa. U5 ....4.75
Sharon,Pa. S3 ....5.20
So.Chicago,Ill. U5 ....4.75
SparrowsPoint,Md. B2 ....4.75

FLOOR PLATES
Cleveland J5 ....4.75
Conshohocken,Pa. A3 ....4.75
Harrisburg,Pa. C5 ....5.95
Ind.Harbor,Ind. I-2 ....4.75
Munhall,Pa. U5 ....4.75
So.Chicago,Ill. U5 ....4.75

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ....3.95
Ashland,l.c.l(15) A10 ....4.45
Cleveland,c.l. R2 ....4.30
Warren,O.c.l. R2 ....4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ....3.70
Aliquippa,Pa. J5 ....3.70
Ashland,Ky. (15) A10 ....3.70
Bessemer,Ala. T2 ....3.70
Clairton,Pa. U5 ....3.70
Claymont,Del. C22 ....4.15
Cleveland J5, R2 ....3.70
Coatesville,Pa. L7 ....4.15
Conshohocken,Pa. A3 ....4.15
Fairfield,Ala. T2 ....3.70
Fontana,Calif.(30) K1 ....4.30
Gary,Ind. U5 ....3.70
GraniteCity,Ill. G4 ....4.40
Geneva,Utah, G1 ....3.70
Harrisburg,Pa. C5 ....6.75
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1..3.70
Johnstown,Pa. B2 ....3.70
Lackawanna,N.Y. B2 ....3.70
Minnequa,Colo. C10 ....4.50
Munhall,Pa. U5 ....3.70
Pittsburgh J5 ....3.70
Seattle B3 ....4.60
Sharon,Pa. S3 ....3.95
So.Chicago,Ill. U5, W14..3.70
SparrowsPoint,Md. B2 ....3.70
Steubenville,O. W10 ....3.70
Warren,O. R2 ....3.70
Weirton,W.Va. W6 ....4.00
Youngstown R2, U5, Y1..3.70

PLATES, Carbon A.R.
Fontana,Calif. K1 ....5.45
Geneva, Utah G1 ....4.85

PLATES Wrought Iron
Economy,Pa. B14 ....8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ....3.70
Aliquippa,Pa. J5 ....3.70
Alton,Ill. L1 ....4.15
Atlanta,Ga. A11 ....4.25
Bessemer,Ala. T2 ....3.70
Buffalo R2 ....3.70
Canton,O. R2 ....3.70
Clairton,Pa. U5 ....3.70
Cleveland R2 ....3.70
Detroit R7 ....3.85
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1..3.70
Johnstown,Pa. B2 ....3.70
KansasCity, Mo. S5 ....4.30
Lackawanna,N.Y. B2 ....3.70
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 ....5.00
N.Tonawanda,N.Y. B11..3.70
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ....3.70
Portland,Oreg. O4 ....4.65
Seattle B3, N14 ....4.45
So.Chicago R2,U5,W14 ..3.70
So.Duquesne,Pa. U5 ....3.70
So.SanFran.,Cal. B3 ....4.45
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
Youngstown R2, U5 ....3.70

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ....3.70
Atlanta A11 ....4.25
Johnstown,Pa. B2 ....3.70
Lackawanna,N.Y. B2 ....3.70
Niles,Calif. P1 ....5.00
Portland,Oreg. O4 ....4.65
SanFrancisco S7 ....4.85

BAR SIZE ANGLES; H.R. CARBON
Bethlehem,Pa. B2 ....3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....4.30
Buffalo R2 ....4.30
Canton,O. R2 ....4.30
Canton,O.(29) T7 ....3.95
Clairton,Pa. U5 ....4.30
Detroit R7 ....4.45
Ecorse,Mich. G5 ....4.65
Fontana,Calif. K1 ....5.35
Gary,Ind. U5 ....4.30
Houston,Tex. S5 ....4.70
Ind.Harbor,Ind. I-2, Y1..4.30
Johnstown,Pa. B2 ....4.30
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ....4.30
LosAngeles B3 ....5.35
Massillon,O. R2 ....4.30
Midland,Pa. C18 ....4.30
So.Chicago R2,U5,W14..4.30
So.Duquesne,Pa. U5 ....4.30
Struthers,O. Y1 ....4.30
Warren,O. C17 ....4.30
Youngstown U5 ....4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ....4.55
Gary,Ind. U5 ....4.55
Youngstown U5 ....4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.55
Bessemer,Ala. T2 ....5.55
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.55
Cleveland R2 ....5.55
Fairfield,Ala. T2 ....5.55
Fontana,Calif. K1 ....6.60
Gary,Ind. U5 ....5.55
Ind.Harbor,Ind. I-2 ....5.55
IndianaHarbor,Ind. Y1 ..6.05
Johnstown,Pa. B2 ....5.55
Lackawanna,N.Y. B2 ....5.55
LosAngeles B3 ....6.25
Pittsburgh J5 ....5.55
Seattle B3 ....6.30
So.SanFrancisco B3 ....6.30
Struthers, O. Y1 ....6.05
Youngstown U5 ....5.55

BARS,Cold-Finished Carbon
Ambridge,Pa. W18 ....4.55
BeaverFls,Pa. M12,R2 4.55
Buffalo B5 ....4.60
Camden,N.J. P13 ....5.00
Carnegie,Pa. C12 ....4.55
Chicago W18 ....4.55
Cleveland A7, C20 ....4.55
Detroit P17 ....4.70
Donora,Pa. A7 ....4.55
Elyria,O. W8 ....4.55
FranklinPark, Ill. N5 ....4.55
Gary,Ind. R2 ....4.55
GreenBay, Wis. F7 ....4.55
Hammond,Ind. L2, M13..4.55
Hartford,Conn. R2 ....5.10
Harvey,Ill. B5 ....4.55
LosAngeles R2 ....6.00
Mansfield,Mass. B5 ....5.10
Massillon,O. R2, R8 ....4.55
Monaca, Pa. S17 ....4.55
Newark,N.J. W18 ....5.00
Plymouth,Mich. P5 ....4.80
Pittsburgh J5 ....4.55
Putnam,Conn. W18 ....5.10
Readville,Mass. C14 ....5.10
St. Louis,Mo. M5 ....4.95
So.Chicago, Ill. W14 ....4.55
SpringCity,Pa. (5) K3 ....5.00
Struthers,O. Y1 ....4.55
Waukegan,Ill. A7 ....4.55
Youngstown F3, Y1 ....4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12 ....5.40
Bethlehem,Pa. B2 ....5.40
Buffalo B5 ....5.40
Camden,N.J. P13 ....5.80
Canton,O. R2 ....5.40
Canton,O.(29) T7 ....4.90
Carnegie,Pa. C12 ....5.40
Chicago W18 ....5.40
Cleveland A7 ....5.45
Cleveland C20 ....5.40
Detroit P17 ....5.55
Donora,Pa. A7 ....5.45
Elyria,O. W8 ....5.40
Gary,Ind. R2 ....5.40
Hammond,Ind. L2, M13..5.40
Hartford,Conn. R2 ....5.85
Harvey,Ill. B5 ....5.40
Lackawanna,N.Y. B2 ....5.40
Mansfield,Mass. B5 ....5.85
Massillon,O. R2,R8 ....5.40
Midland,Pa. C18 ....5.40
Monaca,Pa. S17 ....5.40
Newark,N.J. W18 ....5.75
Plymouth,Mich. P5 ....5.60
So.Chicago,Ill. R2, W14..5.40
Struthers,O. Y1 ....5.40
Warren,O. C17 ....5.40
Waukegan,Ill. A7 ....5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 ....5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ....4.75
ChicagoHts.(3,4) I-2 ....4.75
Franklin,Pa.(3,4) F5 ....4.75
FortWorth,Tex.(26) T4 ..4.85
Huntingtn,W.Va.(3) W7..5.50
Marion,O.(3) P11 ....4.75
Moline,Ill.(3) R2 ....4.70
Tonawanda(3,4) B12 ....4.75
Williamsport(3) S19 ....5.00
Williamsport(4) S19 ....5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt)U1 15.00
Dover,(Eng.Bolt) U1 ....13.50
Economy,(Wgt. Iron) U1 12.00
Economy,Pa. (S.R.) B14 9.60
Economy,Pa. (D.R.)B14 11.90
Economy,(Staybolt)B14 12.20
McK.Rks.(Staybolt) L5..14.50
McK.Rks.(S.R.) L5 ....9.60
McK.Rks.(D.R.) L5 ....13.90

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ....3.70
Atlanta A11 ....4.25
Buffalo R2 ....3.70
Cleveland R2 ....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1..3.70
Johnstown,Pa. B2 ....3.70
KansasCity, Mo. S5 ....4.30
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.20
Minnequa,Colo. C10 ....4.50
Niles,Calif. P1 ....5.05
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ....3.70
Portland,Oreg. O4 ....4.65
SandSprings,Okla. S5 ....4.60
Seattle B3, N14 ....4.45
So. Chicago,Ill. R2 ....3.70
So. Duquesne,Pa. U5 ....3.70
So.SanFrancisco B3 ....4.45
SparrowsPoint,Md. B2 ....3.70
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Youngstown, R2, U5 ....3.70

BARS, Reinforcing
(Fabricated; to Consumers)
Huntington,W.Va. W7 ..5.50
Johnstown, ¾-1" B2 ....4.75
LosAngeles B3 ....5.45
Marion,O. P11 ....5.00
Seattle B3, N14 ....5.55
So.SanFrancisco B3 ....5.40
SparrowsPt. ¾-1" B2 ....4.75
Williamsport, Pa. S13 ..5.10

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 ....3.60
Ashland,Ky.(8) A10 ....3.60
Butler,Pa. A10 ....3.60
Cleveland J5, R2 ....3.60
Conshohocken,Pa. A3 ....4.00
Detroit M1 ....4.40
Ecorse,Mich. (8) G5 ....3.80
Fairfield,Ala. T2 ....3.60
Fontana,Calif. K1 ....4.56
Gary,Ind. U5 ....3.60
GenevaUtah G1 ....3.70
GraniteCity,Ill. G4 ....4.30
Ind.Harbor,Ind. I-2, Y1..3.60
Irvin,Pa. U5 ....3.80
Lackawanna,N.Y. B2 ....3.60
Munhall,Pa. U5 ....3.60
Niles,O. N12 ....5.26
Pittsburg,Calif. C11 ....4.30
Pittsburgh J5 ....3.60
Sharon,Pa. S3 ....4.00
So.Chicago,Ill. W14 ....3.60
SparrowsPoint,Md. B2 ....3.60
Steubenville,O. W10 ....3.60
Torrance,Calif. C11 ....4.30
Warren,O. R2 ....3.60
Weirton,W.Va. W6 ....3.60
WestLeechburg,Pa. A4..3.75
Youngstown U5, Y1 ....3.60

SHEETS, H.R., (19 gage)
AlabamaCity,Ala. R2 ....4.75
Dover,O. R1 ....5.65
Ind.Harbor,Ind. I-2, ...5.40
Mansfield O. E6 ....5.75
Niles,O. N12 ....5.75
Torrance,Calif. C11 ....5.40

SHEETS, H.R., (14-ga., heavier)
High-Strength Low-Alloy
Cleveland J5, R2 ....5.40
Conshohocken,Pa. A3 ..5.65
Ecorse,Mich. G5 ....5.95
Fairfield,Ala. T2 ....5.40
Fontana,Calif. K1 ....6.35
Gary,Ind. U5 ....5.40
Ind.Harbor,Ind. I-2 ....5.40
IndianaHarbor,Ind. Y1 ..5.90
Irvin,Pa. U5 ....5.40
Lackawanna(35) B2 ....5.40
Pittsburgh J5 ....5.40
Sharon,Pa. S3 ....5.40
So.Chicago,Ill. U5 ....5.40
SparrowsPoint (36) B2 ..5.40
Warren,O. R2 ....5.40
Weirton,W.Va. W6 ....5.75
Youngstown U5 ....5.40
Youngstown Y1 ....5.90

SHEETS, Cold-Rolled
High-Strength Low-Alloy
Cleveland J5, R2 ....6.55
Ecorse,Mich. G5 ....7.10
Fontana,Calif. K1 ....7.50
Gary,Ind. U5 ....6.55
IndianaHarbor,Ind. Y1..7.05
IndianaHarbor,Ind. I-2 ..6.55
Irvin,Pa. U5 ....6.55
Lackawanna(37) B2 ....6.55
Pittsburgh J5 ....6.55
SparrowsPoint(38) B2 ..6.55
Warren,O. R2 ....6.55
Weirton,W. Va. W6 ....6.90
Youngstown Y1 ....7.05

SHEETS, SILICON .22 Ga. & 24 Ga. 22 Ga.	Armco	Rem-		Sumar-
COILS Cut Lengths (as shown)	Penna	ware	ming	Motor	ner
Beech Bottom, W.Va. (cut lengths)					
Brackenridge, Pa. A4					
Brackenridge, Pa. (24 Ga. cut lengths)					
Follansbee, W.Va. (cut lengths)					
Mansfield, O. 28 (cut lengths)					
Niles, O. (cut lengths)					
Vandergrift, Pa.					
Warren, O. P2					
Zanesville, O. A10					

SHEETS, SILICON .22 Ga. Base: Coils Cut Lengths (as shown) Transformer Grade	72	65	58	52
Beech Bottom, W.Va. (cut lengths	9.45	10.60	12.55	11.30
Brackenridge, Pa. A4	13.55			
Vandergrift, Pa. 05	13.55	10.90	11.60	12.60
Warren, O. P2	13.55			
Zanesville, O. A10	10.55	10.90	11.60	12.60

M.P. or C.R. COILS AND CUT LENGTHS, SILICON 122 Ga.)	T-100	T-90	T-80	T-73
Butler, Pa. A10 (C.R.)			14.75	15.25
Vandergrift, Pa. 05	12.90	13.75	14.75	15.25

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky. (8) A10 ...3.75
Warren,O. R2 .....4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....5.25

TIGHT COOPERAGE HOOP

Atlanta A11 .....4.05
Riverdale,Ill. A1 .....3.90
Sharon,Pa. S3 .....4.15
Youngstown U5 .....3.75

WIRE, Merchant Quality

(6 to 8 gage)	An'id	Galv.
AlabamaCity R2	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(19) K4	5.70	6.15
Buffalo W12	4.85	...
Cleveland A7	5.70	6.15
Crawfordsville M8	5.95	6.40
Donora,Pa. A7	5.70	6.15
Duluth,Minn. A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston,Tex. S5	6.10	6.55
Johnstown B2	5.70	6.15
Joliet,Ill. A7	5.70	6.15
KansasCy,Mo. S5	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	...
Minnequa C10	5.95	6.45
Monessen P7	5.95	6.40
Palmer W12	5.15	...
Pitts.,Calif. C11	6.85	6.60
Prtsmth.(18)P12	6.10	6.60
Rankin A7	5.70	6.15
So.Chicago R2	5.70	5.95
So.S.Fran. C10	6.65	7.10
SparrowsPt. B2	5.80	6.25
Sterling,Ill.(1)N15	5.70	6.15
Struthers,O. Y1	5.70	6.15
Torrance,Cal. C11	6.65	...
Worcester A7	6.00	6.45

	An'id	Galv.
Worcester J4, T6	8.85	9.10

WIRE (16 gage) Stone Stone

Aliquippa J5	10.15	12.15
Bartonville(1) K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfrdsvile MS	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.25	12.15
Palmer,Mass.W12	10.25	12.15
Pitts.Cal. C11	10.60	12.50
Prtsmth.(18) P12	10.55	12.30
SparrowsPt. B2	10.35	12.25
Waukegan A7	10.25	12.15

ROPE WIRE (A) (B)

Alton,Ill. L1	8.65	8.90
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Fostoria,O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7	8.80	9.05
Palmer,Mass. W12	8.85	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5	8.85	9.10
SparrowsPt. B2	8.65	8.90
Struthers,O. Y1	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	4.85
Aliquippa,Pa. J5	4.85
Atlanta A11	5.10
Alton,Ill. L1	5.05
Bartonville,Ill.(1) K4	4.85
Buffalo W12	4.85
Chicago W13	5.10
Cleveland A7, C20	4.85
Crawfordsville,Ind. MS	5.10
Donora,Pa. A7	4.85
Duluth,Pa. A7	4.85
Fairfield,Ala. T2	4.85
Fostoria,O.(24) S1	5.35
Houston S5	5.25
Johnstown,Pa. B2	4.85
Joliet,Ill. A7	4.85
KansasCity,Mo. S5	5.45
Kokomo,Ind. C16	4.95
LosAngeles B3	5.80
Minnequa,Colo. C10	5.10
Monessen,Pa. P7	5.10
Newark, 6-8 ga. I-1	5.50
No.Tonawanda B11	4.85
Palmer,Mass. W12	5.15
Pittsburg,Calif. C11	5.80
Portsmouth,O. P12	5.25
Rankin,Pa. A7	4.85
So.Chicago,Ill. R2	4.85
So.SanFrancisco C10	5.80
SparrowsPoint,Md. B2	4.95
Sterling,Ill.(1) N15	4.85
Struthers,O. Y1	4.85
Torrance,Calif. C11	5.80
Waukegan,Ill. A7	4.85
Worcester,Mass. A7, T6	5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	6.20
Buffalo W12	6.35
Cleveland A7	5.85
Crawfordsville,Ind. MS	6.20
Detroit D2	6.20
Dover,O. W6	6.20
Fostoria,O. S1	6.00
Kokomo,Ind. C16	5.70
FranklinPark,Ill. T6	6.20
Massillon,O. R8	5.85
Monessen,Pa. P16	5.85
Monessen,Pa. P7	6.10
NewHaven,Conn. D2	6.50
Pawtucket,R.I.(12) NS	6.85
Trenton,N.J. R5	6.15
Worcester A7	6.15
Worcester T6	6.50
Worcester W12	6.65

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1) K4	8.90
Buffalo W12	8.90
Chicago W13	8.90
Cleveland A7	8.90
Crawfordsville,Ind. MS	8.95
Fostoria,O. S1	8.90
Johnstown,Pa. B2	8.90
Kokomo,Ind. C16	8.90
Monessen,Pa. P16	8.90
Palmer,Mass. W12	9.20
Portsmouth,O. P12	8.90
Roebling,N.J. R5	9.20
Waukegan,Ill. A7	8.90
Worcester,Mass. A7, T6	9.20

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	8.50
Monessen,Pa. P16	8.50
Roebling,N.J. R5	8.80
SparrowsPoint,Md. B2	8.60
Johnstown,Pa. B2	8.50

WIRE, Tire Bead

Bartonville,Ill.(1) K4	10.90
Monessen,Pa. P16	11.40
Roebling,N.J. R5	11.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	6.25
Alton,Ill. L1	6.45
Bartonville,Ill.(1) K4	6.25
Buffalo W12	6.25
Cleveland A7	6.25
Donora,Pa. A7	6.25
Duluth A7	6.25
Fostoria,O. S1	6.55
Johnstown,Pa. B2	6.25
LosAngeles B3	7.20
Milbury,Mass.(12) N6	8.05
Monessen,Pa. P7, P16	6.25
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Roebling,N.J. R5	6.25
Portsmouth,O. P12	6.25
So.Chicago,Ill. R2	6.25
So.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Struthers,O. Y1	6.25
Trenton,N.J. A7	6.55
Waukegan,Ill. A7	6.25
Worcester A7, T6, W12	6.55
Worcester,Mass. J4	6.75

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.90
Alton,Ill. L1	6.10
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth,Minn. A7	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Monessen,Pa. P7, P16	5.90
NewHaven,Conn. A7	6.20
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
So.SanFrancisco C10	6.85
SparrowsPoint,Md. B2	6.00
Torrance,Calif. C11	6.85
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Worcester,Mass. A7	6.20

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2	126
Ala.City,Ala.,17-18ga.R2	213
Aliquippa,Pa.9-14½ga.J5	130
Atlanta A11	133
Bartonville,Ill.(19) K4	130
Crawfordsville,Ind. MS	132
Donora,Pa. A7	130
Duluth,Minn. A7	130
Fairfield,Ala. T2	130
Houston,Tex. S5	138
Johnstown,Pa. B2	130
Johnstown,17ga.,6" B2	204
Johnstown,17ga.,4" B2	207
Joliet,Ill. A7	130
KansasCity,Mo. S5	142
Kokomo,Ind. C16	132
Minnequa,Colo. C10	138
Monessen,Pa. P7	135
Pittsburg,Calif. C11	153
Portsmouth,O.(18) P12	137
Rankin,Pa. A7	130
So.Chicago,Ill. R2	126
Sterling,Ill.(1) N15	130

FENCE POSTS

Chicagolits.,Ill. C2	140
Duluth,Minn. A7	125
Franklin,Pa. F5	140
Huntington,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	130
Moline,Ill. R2	136
So.Chicago R2	140
Tonawanda,N.Y. B12	140
Williamsport,Pa. S19	130

WIRE, Barbed Col.

AlabamaCity,Ala. R2	136
Aliquippa,Pa. J5	140
Atlanta A11	143
Bartonville,Ill.(19) K4	143
Crawfordsville,Ind. MS	145
Donora,Pa. A7	140
Duluth,Minn. A7	140
Fairfield,Ala. T2	140
Houston,Tex. S5	148
Johnstown,Pa. B2	140
Joliet,Ill. A7	140
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	146
Monessen,Pa. P7	145
Pittsburg,Calif. C11	160
Portsmouth,O.(18) P12	147
Rankin,Pa. A7	140
So.Chicago,Ill. R2	136
So.SanFran.,Calif. C10	160
SparrowsPoint,Md. B2	142
Sterling,Ill.(1) N15	140

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	123
Atlanta A11	126
Bartonville,Ill.(19) K4	123
Crawfordsville,Ind. MS	132
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	123
Minnequa,Colo. C10	128
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	6.10
Bartonville,Ill.(19) K4	5.95
Crawfordsville,Ind. MS	6.30
Donora,Pa. A7	5.95
Duluth,Minn. A7	5.95
Johnstown,Pa. B2	5.95
Joliet,Ill. A7	5.95
Kokomo,Ind. C16	6.05
Minnequa,Colo. C10	6.20
Pittsburg,Calif. C11	6.90
Portsmouth,O. P12	6.25
Rankin,Pa. A7	5.95
So.Chicago,Ill. R2	6.10
SparrowsPoint,Md. B2	6.05
Sterling,Ill.(1) N15	5.85
Worcester,Mass. A7	6.25

NAILS, Cut (100 lb keg)

To dealers (33)	
Conshohocken,Pa. A3	$7.35
Wheeling,W.Va. W10	7.35

NAILS & STAPLES, Stock

To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	118
Aliquippa,Pa.(13) J5	118
Atlanta A11	121
Bartonville,Ill.(19) K4	118
Chicago,Ill. W13	118
Cleveland A9	125
Crawfordsville,Ind. MS	122
Donora,Pa. A7	118
Duluth,Minn. A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	126
Houston,Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburg,Calif. C11	137
Portsmouth,O. P12	124
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	124

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.40
Lebanon,Pa. B2	6.15
Minnequa,Colo. C10	6.15
Pittsburgh J5	6.15
Seattle B3	6.65
So.Chicago,Ill. R2	6.15
Struthers,O. Y1	6.15
Youngstown R2	6.15

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.85
Lebanon,Pa. B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh O3, P14	9.85
Seattle B3	10.35

TIE PLATES

Fairfield,Ala. T2	4.50
Gary,Ind. U5	4.50
Ind.Harbor,Ind. I-2	4.50
Lackawanna,N.Y. B2	4.50
Minnequa,Colo. C10	4.50
Pittsburg,Calif. C11	4.65
Seattle B3	4.65
Steelton,Pa. B2	4.50
Torrance,Calif. C11	4.65

JOINT BARS

Bessemer,Pa. U5	4.70
Fairfield,Ala. T2	4.70
Ind.Harbor,Ind. I-2	4.70
Joliet,Ill. U5	4.70
Lackawanna,N.Y. B2	4.70
Minnequa,Colo. C10	4.70
Steelton,Pa. B2	4.70

AXLES

Ind.Harbor,Ind. S18	5.60
Johnstown,Pa. B2	5.60

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50	...	4.00
Fairfield,Ala. T2	...	...	...	4.00
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	...
Johnstown,Pa. B2	...	...	...	(16)4.00
Lackawanna,N.Y. B2	3.60	3.50	...	4.00
Minnequa,Colo. C10	3.60	3.50	...	4.50
Steelton,Pa. B2	3.60	3.50	...	...
Williamsport,Pa. S19	...	...	...	4.75

TOOL STEEL

—Grade by Analysis—

Grade	$ per lb	W	Cr	V	Co	Mo	$ per lb
Reg. Carbon	0.230-20.25		4.25	1.6	12.25	...	3.535-3.675
Extra Carbon	0.270	19	4	2	7	...	2.460
Spec. Carbon	0.325	18.25	4.25	1	4.75	...	2.125
Oil Hardening	0.350	18	4	2	9	...	2.445-2.450
5%CrHotWrk	0.350	13.5	4	3	...	...	1.60¼
Hi-Carbon-Cr	0.635	6.4	4.5	1.9	...	5	0.96-0.965
18W,4Cr,1V	1.505	6	4	3	...	6	1.190
18W,4Cr,2V	1.650	1.5	4	1	...	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2, V3.

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 NewEng-HighCarb.,Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RellanceDiv.,EatonMfg.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 YoungstownSheet&Tube

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia, del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ¼" and thinner.
(16) 4⅝ lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(23) 28 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 5.60c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared: add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. edge or square edge.
(33) To jobbers, deduct 20 cents.
(34) 7.50c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter: 60" & narrower.
(38) 16 gage & lighter: 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035": 0.035" and heavier, 0.25c higher.

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.35
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind.Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.00
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W. Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10
Torrance,Calif. C11	5.10

BLUED Stock, 29 ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23)F4	6.85

ROOFING SHORT TERNES (8 lb. Coated)

Gary,Ind. U5	9.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb (Commercial Quality)

Yorkville,O. W10	$8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

SHEETS, Culvert No. 16	Cu	Cu Alloy
Ashland,Ky. A10	5.60	...
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16	6.25	...
MartinsFy.O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	...
SparrowsPt. B2	5.60	...
Torrance,Cal. C11	6.35	...

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.85
Cleveland R2	4.20
Ind.Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TINPLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.,Sal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va. W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

STRIP, Hot-Rolled Alloy

Bridgprt,Conn.(10) S15	5.45
Carnegie,Pa. S18	5.50
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S3	6.10
Midland,Pa. C18	5.85
NewBritn,Conn.(10) S15	5.45
Sharon,Pa. S3	5.85
Youngstown U5	5.50

STRIP, Hot-Rolled High-strength Low-Alloy

Bessemer,Ala. T2	5.50
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill. L1	3.95
Ashland,Ky.(8) A10	3.50
Atlanta A11	4.65
Bessemer,Ala. T2	3.50
Bridgeprt,Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	4.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(32)B2	3.50
LosAngeles B3	4.25
LosAngeles C1	4.60
Minnequa,Colo. C10	4.55
NewBritain(10) S15	4.00
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.50
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Cold-Rolled Alloy Steel

Bridgprt,Conn.(10)S15	10.75
Carnegie,Pa. S18	10.60
Cleveland A7	10.60
Dover,O. G6	10.50
Fontana,Calif. K1	11.65
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60
NewBritn,Conn.(10)S15	10.75
Pawtucket,R.I. R3	10.60
Pawtucket,R.I.(11) N8	10.75
Pawtucket,R.I.(12) N8	11.05
Sharon,Pa. S3	10.60
Youngstown C8	10.60

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgeprt,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	6.30
FranklinPark,Ill.(40)T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle(40) E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) N8	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1	...	...	7.70	9.65	...
Carnegie,Pa. S18	...	6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	...	...	...
Detroit D2	5.60	6.65	7.25	...	...
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18	...	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	...
NewCastle,Pa. B5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	...	...
NewYork W3	...	7.10	7.70	9.65	11.95
Pawtucket,R.I. N8:					
Cleve.orPitts.Base	...	6.80	7.40	9.35	11.65
Worcester,Mass.,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	...	6.80	7.40	9.35	11.65
Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
NewYork W3	...	...	10.30	12.50	15.35

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths 1½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut-lengths)	...	...	7.25	8.50	9.30
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
GraniteCity,Ill G4 (cut lengths)	...	...	7.95	9.20	...
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths 1½c lower) Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	...	...	...
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	...	...	...
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	...	...	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bolardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky. (8) A10	3.75
Warren,O. R2	4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	5.25

TIGHT COOPERAGE HOOP

Atlanta A11	4.65
Riverdale,Ill. A1	3.90
Sharon,Pa. S3	4.15
Youngstown U5	3.75

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity R2	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(19) K4	5.70	6.15
Buffalo W12	4.85	...
Cleveland A7	5.70	6.15
Crawfordsville MS	5.95	6.40
Donora,Pa. A7	5.70	6.15
Duluth,Minn. A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston,Tex. S5	6.10	6.55
Johnstown B2	5.70	6.15
Joliet,Ill. A7	5.70	6.15
KansasCy,Mo. S5	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	...
Minnequa C10	5.95	6.45
Monessen P7	5.95	6.40
Palmer W12	5.15	...
Pitts.,Calif. C11	6.65	6.80
Prtsmth.(18)P12	6.10	6.60
Rankin A7	5.70	6.15
So.Chicago R2	5.70	5.95
So.S.Fran. C10	6.65	7.10
Sparrow'Pt. B2	5.80	6.25
Sterling,Ill.(1)N15	5.70	6.15
Struthers,O. Y1	5.70	6.15
Torrance,Cal. C11	6.65	...
Worcester A7	6.09	6.45

	An'ld	Galv.
WIRE (16 gage)	**Stone**	**Stone**
Aliquippa J5	10.15	12.15
Bartonville(1) K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfrdsville MS	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.40	12.40
Palmer,Mass. W12	10.25	12.15
Pitts.Cal. C11	10.60	12.50
Prtsmth.(18) P12	10.55	12.30
SparrowsPt. B2	10.35	12.25
Waukegan A7	10.25	12.15

ROPE WIRE (A) (B)

Alton,Ill. L1	8.65	8.90
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Fostoria,O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7	8.80	9.05
Palmer,Mass. W12	8.85	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5	8.85	9.10
SparrowsPt. B2	8.65	8.90
Struthers,O. Y1	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	4.85
Aliquippa,Pa. J5	4.85
Atlanta A11	5.10
Alton,Ill. L1	5.00
Bartonville,Ill.(1) K4	4.85
Buffalo W12	4.85
Chicago W13	5.10
Cleveland A7, C20	4.85
Crawfordsville,Ind. MS	5.10
Donora,Pa. A7	4.85
Duluth,Pa. A7	4.85
Fairfield,Ala. T2	4.85
Fostoria,O.(24) S1	5.35
Houston S5	5.25
Johnstown,Pa. B2	4.85
Joliet,Ill. A7	4.85
KansasCity,Mo. S5	5.45
Kokomo,Ind. C16	4.95
LosAngeles B3	5.80
Minnequa,Colo. C10	5.10
Monessen,Pa. P7	5.10
Newark, 6-8 ga. I-1	5.50
No.Tonawanda B11	4.85
Palmer,Mass. W12	5.15
Pittsburg,Calif. C11	5.80
Portsmouth,O. P12	5.25
Rankin,Pa. A7	4.85
So.Chicago,Ill. R2	4.85
So.SanFrancisco C10	5.80
SparrowsPoint,Md. B2	4.95
Sterling,Ill.(1) N15	4.85
Struthers,O. Y1	4.85
Torrance,Calif. C11	5.80
Waukegan,Ill. A7	4.85
Worcester,Mass. A7, T6	5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	6.20
Buffalo W12	6.35
Cleveland A7	5.80
Crawfordsville,Ind. MS	6.20
Detroit D2	6.20
Dover,O. G6	6.20
Fostoria,O. S1	6.00
Kokomo,Ind. C16	5.70
FranklinPark,Ill. T6	6.20
Massillon,O. R5	5.85
Monessen,Pa. P16	5.85
Monessen,Pa. P7	6.10
NewHaven,Conn. D2	6.50
Pawtucket,R.I.(12) NS	6.85
Trenton,N.J. R5	6.15
Worcester A7	6.15
Worcester T6	6.50
Worcester W12	6.65

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1) K4	8.90
Buffalo W12	8.90
Chicago W13	8.90
Cleveland A7	8.90
Crawfordsville,Ind. MS	8.95
Fostoria,O. S1	8.90
Johnstown,Pa. B2	8.90
Kokomo,Ind. C16	8.90
Monessen,Pa. P16	8.90
Palmer,Mass. W12	9.20
Portsmouth,O. P12	8.90
Roebling,N.J. R5	9.20
Rankin,Pa. A7	8.90
Worcester,Mass. A7, T6	9.20

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	8.50
Monessen,Pa. P16	8.50
Roebling,N.J. R5	8.80
SparrowsPoint,Md. B2	8.60
Johnstown,Pa. B2	8.50

WIRE, Tire Bead

Bartonville,Ill.(1) K4	10.90
Monessen,Pa. P16	11.40
Roebling,N.J. R5	11.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	6.25
Alton,Ill. L1	6.45
Bartonville,Ill.(1) K4	6.25
Buffalo W12	6.25
Cleveland A7	6.25
Donora,Pa. A7	6.25
Duluth A7	6.25
Fostoria,O. S1	6.25
Johnstown,Pa. B2	6.25
LosAngeles B3	7.20
Milbury,Mass.(12) N6	8.05
Monessen,Pa. P7, P16	6.25
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Roebling,N.J. R5	6.55
Portsmouth,O. P12	6.25
So.Chicago,Ill. R2	6.25
So.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Struthers,O. Y1	6.25
Trenton,N.J. A7	6.55
Waukegan,Ill. A7	6.25
Worcester,Mass. J4	6.75

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.90
Alton,Ill. L1	6.10
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth,Minn. A7	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Monessen,Pa. P7, P16	5.90
NewHaven,Conn. A7	6.20
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
So.SanFrancisco C10	6.85
SparrowsPoint,Md. B2	6.00
Torrance,Calif. C11	6.85
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Worcester,Mass. A7	6.20

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2	126
Ala.City,Ala.,17-18ga.R2	213
Aliquippa,Pa.9-14½ga.J5	130
Atlanta A11	133
Bartonville,Ill.(19) K4	139
Crawfordsville,Ind. MS	142
Donora,Pa. A7	130
Duluth,Minn. A7	130
Fairfield,Ala. T2	130
Houston,Tex. S5	138
Johnstown,Pa. B2	130
Johnstown,17ga.,6" B2	204
Johnstown,17ga.,4" B2	207
Joliet,Ill. A7	130
KansasCity,Mo. S5	142
Kokomo,Ind. C16	132
Minnequa,Colo. C10	138
Monessen,Pa. P7	135
Pittsburg,Calif. C11	153
Portsmouth,O.(18) P12	137
Rankin,Pa. A7	130
So.Chicago,Ill. R2	126
Sterling,Ill.(1) N15	130

FENCE POSTS

ChicagoHts.,Ill. C2	140
Duluth,Minn. A7	125
Franklin,Pa. F5	140
Huntington,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	130
Moline,Ill. R2	136
So.Chicago R2	140
Tonawanda,N.Y. B12	140
Williamsport,Pa. S19	150

WIRE, Barbed Col.

AlabamaCity,Ala. R2	136
Aliquippa,Pa. J5	140
Atlanta A11	143
Bartonville,Ill.(19) K4	143
Crawfordsville,Ind. MS	145
Donora,Pa. A7	140
Duluth,Minn. A7	140
Fairfield,Ala. T2	140
Houston,Tex. S5	148
Johnstown,Pa. B2	140
Joliet,Ill. A7	140
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	146
Monessen,Pa. P7	145
Pittsburg,Calif. C11	160
Portsmouth,O.(18) P12	147
Rankin,Pa. A7	140
So.Chicago,Ill. R2	136
So.SanFran.,Calif. C10	160
SparrowsPoint,Md. B2	142
Sterling,Ill.(1) N15	140

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	123
Atlanta A11	126
Bartonville,Ill.(19) K4	123
Crawfordsville,Ind. MS	132
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	6.10
Bartonville,Ill.(19) K4	5.95
Crawfordsville,Ind. MS	6.30
Donora,Pa. A7	5.95
Duluth,Minn. A7	5.95
Johnstown,Pa. B2	5.95
Joliet,Ill. A7	5.95
Kokomo,Ind. C16	6.05
Minnequa,Colo. C10	6.20
Pittsburg,Calif. C11	6.90
Portsmouth,O. P12	6.25
Rankin,Pa. A7	5.95
So.Chicago,Ill. R2	6.10
SparrowsPoint,Md. B2	6.05
Sterling,Ill.(1) N15	5.65
Worcester,Mass. A7	6.25

NAILS, Cut (100 lb keg)
To dealers (33)

Conshohocken,Pa. A3	$7.35
Wheeling,W.Va. W10	7.35

NAILS & STAPLES, Stock
To dealers & mfrs. (7) **Col.**

AlabamaCity,Ala. R2	118
Aliquippa,Pa.(13) J5	118
Atlanta A11	121
Bartonville,Ill.(19) K4	118
Chicago,Ill. W13	118
Cleveland A9	125
Crawfordsville,Ind. MS	122
Donora,Pa. A7	118
Duluth,Minn. A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	126
Houston,Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburg,Calif. C11	137
Portsmouth,O. P12	124
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	124

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.40
Lebanon,Pa. B2	6.15
Minnequa,Colo. C10	6.15
Pittsburgh J5	6.15
Seattle B3	6.65
So.Chicago,Ill. R2	6.15
Struthers,O. Y1	6.15
Youngstown R2	6.15

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.85
Lebanon,Pa.(32) B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh O3, P14	9.85
Seattle B3	10.35

TIE PLATES

Fairfield,Ala. T2	4.50
Gary,Ind. U5	4.50
Ind.Harbor,Ind. I-2	4.50
Lackawanna,N.Y. B2	4.50
Minnequa,Colo. C10	4.50
Pittsburg,Calif. C11	4.65
Seattle B3	4.65
Steelton,Pa. B2	4.50
Torrance,Calif. C11	4.65

JOINT BARS

Bessemer,Pa. U5	4.70
Fairfield,Ala. T2	4.70
Ind.Harbor,Ind. I-2	4.70
Joliet,Ill. U5	4.70
Lackawanna,N.Y. B2	4.70
Minnequa,Colo. C10	4.70
Steelton,Pa. B2	4.70

AXLES

Ind.Harbor,Ind. S18	5.60
Johnstown,Pa. B2	5.60

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50	...	4.00
Fairfield,Ala. T2	...	...	...	4.00
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	...
Johnstown,Pa. B2	...	...	...	(16)4.00
Lackawanna B2	3.60	3.50	...	4.00
Minnequa,Colo. C10	3.60	3.50	...	4.50
Steelton,Pa. B2	3.60	3.50	...	...
Williamsport,Pa. S19	...	...	...	4.75

TOOL STEEL

—Grade by Analysis—

Grade	$ per lb	W	Cr	V	Co	Mo	$ per lb
Reg. Carbon	0.230	20	4	1	12	..	3.535-3.675
Extra Carbon	0.270	19	4	2	7	..	2.460
Spec. Carbon	0.325	18	4	1	4.75	..	2.125
Oil Hardening	0.350	18	4	2	9	..	2.445-2.460
5%CrHotWrk	0.350	13	5	4	3	..	1.60¼
Hi-Carbon-Cr	0.635	5.4	4.5	1.9	..	5	0.96-0.965
18W,4Cr,1V	1.505	6	4	1	5	6	1.190
18W,4Cr,2V	1.650	1.5	4	1	..	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2, V3.

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ¼" and thinner.
(16) 40 lb and under.
(17) Plate only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(23) 28 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill basis.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.60c.
(27) Bar mill sizes.
(28) Rondoriized.
(29) Subject to 10% increase.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. edge or square edge.
(33) To jobbers, deduct 20 cents.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 NewEng-HighCarb. Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.

U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 YoungstownSheet&Tube

Check on its
Uniformity –
Economy –
Toughness –
20th Century
the persuasive abrasive
One of the world's largest producers of quality shot and grit—*Normalized—Cut-wire—Hard Iron
*Copyrighted Trade Name
THE CLEVELAND Metal Abrasive CO.
884 East 67th Street Cleveland 8, Ohio
Howell Works: Howell, Michigan

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	34.0	32.0	29.0	1.5	+6.5	+3.5
¼	6.0	0.42	28.5	26.5	23.5	+1.0	+3.0	+6.0
⅜	6.0	0.57	23.5	21.5	18.5	+7.0	+9.0	+12.0
½	8.5	0.85	36.0	34.0	35.0	14.0	12.0	13.0
¾	11.5	1.18	39.0	37.0	38.0	18.0	16.0	17.0
1	17.0	1.68	41.5	39.5	40.5	21.5	19.5	20.5
1¼	23.0	2.28	42.0	44.0	41.0	22.0	24.0	21.0
1½	27.5	2.78	42.5	41.5	41.5	22.0	21.5	22.0
2	37	3.68	43.0	41.0	42.0	23.5	21.5	22.5
2½	58.5	5.82	43.5	41.5	42.5	24.0	22.0	23.0
3	76.5	7.62	43.5	41.5	42.5	24.0	22.0	23.0

Column A: Etna, Pa. N2; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ⅛", 1½ points lower on ¼", and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ⅜", 2 points lower on ½" and ¾". Following make ½" and larger: Lorain, O., N3; Youngstown R2 and 36¼% on 3½" and 4". Youngstown Y1; Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4". Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y1; Alton, Ill., 2 points lower discount L1.

Column D: Butler, Pa. F6, ⅛-⅜"; Benwood, W. Va. W10, except plus 3½% on ⅛", plus 2½% on ¼", plus 9% on ⅜"; Sharon, Pa. M6, plus 0.5 on ⅛", 1 point lower on ½", ¾", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 16½% on 3½" and 4"; Youngstown Y1. Aliquippa, Pa. J5 quotes 1 point lower on ⅜", 2 points lower on ½", 1½ points lower on 1¼", 2 points lower on 1½" and 2". 1½ points lower on 2½" and 3"; Etna, Pa. N2 and 18½% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	29.5	9.5	29.5	9.5
2½	58.5	5.82	32.5	12.5	32.5	12.5
3	76.5	7.62	32.5	12.5	32.5	12.5
3½	92.0	9.20	34.5	14.5	34.5	14.5
4	$1.09	10.89	34.5	14.5	34.5	14.5
5	1.48	14.81	37.0	17.0	37.0	17.0
6	1.92	19.18	37.0	17.0	37.0	17.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	23.62	19.62	22.69
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2¼	12	26.92	32.97	26.98	31.76
2½	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding	Plates— Carbon Base 10%	Plates— Carbon Base 20%	Strip— Cold-Rolled Carbon Base 10%	Strip— Cold-Rolled Carbon Base Both Sides	Sheets— Carbon Base 10%	Sheets— Carbon Base 20%	Sheets— Cu Base Both Sides
302	....	....	....	....	19.75	26.24-27.50	77.00
304	25.00	29.50	....	....	24.50	27.50-27.77	77.00
309	39.50	35.00	....	....	....	....	....
310	36.50	41.00	....	....	....	....	144.00
316	29.50	34.00	....	....	26.00	35.92-36.50	....
317	34.50	39.00	....	....	....	....	....
318	33.50	38.00	....	....	....	....	....
321	26.50	31.00-32.00	....	....	23.00	33.00	111.00
347	27.50	32.00	....	....	24.00	33.50-33.83	130.00
405	21.25	27.75	....	....	....	....	....
410	20.75	27.25	....	....	....	....	....
Nickel	33.55	45.15	41.00	54.00	....	....	....
Inconel	41.23	54.18	....	....	....	....	165.00
Monel	34.93	46.28	....	....	....	....	....
Copper*	....	....	23.70†	29.65‡	....	....	....

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:

½-in. & smaller diam.	15
⅝-in. & ¾-in.	18.5
⅞-in. and larger	17.5

Longer than 6 in.:

All diams.	14

Lag bolts, all diams.:

6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap, and Sleigh Shoe	21
Tire bolts	12
Boiler & Fitting-Up bolts	31

NUTS

H.P. & C.P. Square:	Reg.	Hvy.
½-in. & smaller	15	15
⅝-in. & ¾-in.	12	6.5
⅞-in.-1½-in.	9	1
1⅝-in. & larger	7.5	1
H.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ¾-in.	16.5	6.5
⅞-in.-1½-in.	12	2
1⅝-in. & larger	8.5	2
C.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ¾-in.	23	17.5
⅞-in. & 1½-in.	19.5	12
1⅝-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller	28.5	28.5
⅝-in. & ¾-in.	29.5	22
⅞-in.-1½-in.	24	15
1⅝-in. & larger	13	8.5
		Light
½-in. & smaller		35
⅝-in. to ¾-in.		28.5
⅞-in. to 1½-in.		26

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	48 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:

⅝-in. & smaller	42
¾-in. through 1 in.	34

Longer than 6 in.:

⅝-in. & smaller	26
¾-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter

1 in. and smaller diam. x over 6 in.

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger 7.85c

⅞-in. under 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..List to list-plus-$1.

FLUORSPAR

Metallurgical grade, f. o. b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95
	CARBON	
35,40	110	8.03
30	65,84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03

STAINLESS STEEL

Type	C.R. Sheets	C.R. Strip	Structurals
301	41.00	34.00	31.25
302	41.25	36.75	31.50
303	43.25	40.25	34.00
304	43.25	38.75	33.00
309	56.00	55.00	44.75
316	57.00	56.00	49.25
321	49.25	48.25	37.00
347	53.75	52.25	41.50
410	36.50	30.50	25.75
416	37.00	37.00	26.25
420	44.00	47.00	31.25
430	39.00	31.00	28.25
501	27.50	26.00	14.25
502	28.50	27.00	15.25

Bolt, Types 301-347 sheet, quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, except 303 and 309 E2.

Brackenridge, Pa., sheets A4 sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 and 0.25c lower on Types 302, 304, 321, 347; 0.50c lower on Types 309 and 316 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302; 38.50c, 304; 58.50c, 316; 52.00c, 347; 30.50c, 410; 31.00c, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars, except 31.50c on Type 501 and 45.25c on 309 C4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip, W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309; 316 sheets 62.00c, strip 64.00c W4.

Watervliet, N. Y., structurals & bars A4 quotes slight variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip, except Types 303, 309, 316, 416, 501 and 502 and 34.25c on Type 301.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol 30.00-35.00

Toluol, one deg. ..26.00-33.00

Industrial xylol ..25.00-33.50

Per ton bulk, ovens

Sulphate of ammonia $32-$45

Cents per pound, ovens

Phenol, 40 (carlots, non-returnable drums) ..17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge iron	Cents
98+% Fe, carlots	17.00
Swedish, c.i.f. New York, in bags	8.85-9.95

Electrolytic Iron:

Annealed, 99.5% Fe	42.50
Unannealed, 99 + % Fe	36.50
Unannealed, 99 + % Fe (minus 325 mesh)	58.50
Powder Flakes	48.50

Carbonyl Iron:

97.9-99.8%, size 5 to 10 microns	83.00-148.00

Aluminum:

Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	33.50
Antimony	75.85
Brass, 10-ton lots	30.00-33.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 10 ton lots	50.00

Copper:

Electrolytic	37.25-46.25
Reduced	33.75-37.00
Lead	25.50
Magnesium	75.00-85.00

Manganese:

Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	86.00

Nickel-Silver, 10-ton lots 45.00

Silicon	38.50
Solder (plus cost of metals)	8.50
Stainless Steel, 302	83.00
Zinc, 10-ton lots	23.00-30.50

Tungsten	Dollars
Melting grade, 99%, 60 to 200 mesh, freight allowed:	
1000 lb and over	6.00
Less than 1000 lb	6.15
98.8% minus 65 mesh, freight allowed:	
1000 lb and over	4.15
Less than 1000 lb	4.25
Molybdenum: 99.9%, minus 200 mesh	3.25
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvil.fur.	$14.50-15.00
Connellsvil.fdry.	17.00-18.00
New River foundry	21.30
Wise county, foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

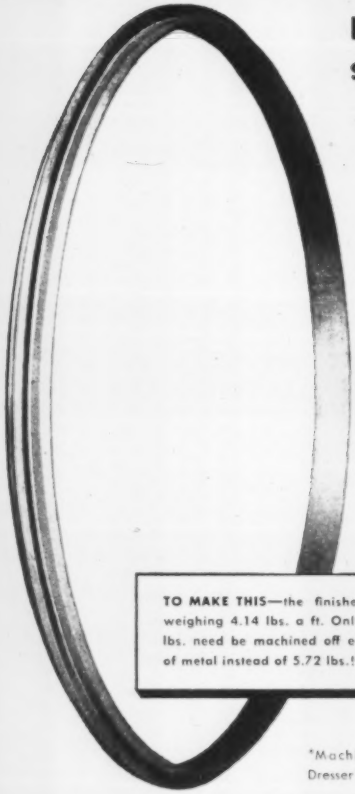
Kearny, N. J., ovens	$22.75
Everett, Mass., ovens	
New England, del.	*24.80
Chicago ovens	23.00
Chicago, del.	24.50
Terre Haute, ovens	22.50
Milwaukee, ovens	23.75
Indianapolis, ovens	22.75
Chicago, del.	26.42
Cincinnati, del.	25.85
Detroit, del.	26.85
Ironton, O., ovens	22.50
Cincinnati, del.	25.12
Painesville, O., ovens	24.00
Cleveland, del.	25.82
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Birmingham, del.	21.60
Philadelphia, ovens	22.70
Nevillelsland,Pa.,ovens	23.00
Swedeland, Pa., ovens	22.60
St. Louis, ovens	
St. Louis, del.	25.40
Portsmouth, O., oven	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	26.89
Flint, del.	26.59
Pontiac, del.	25.47
Saginaw, del.	26.92

* Or within $4.15 freight zone from works.

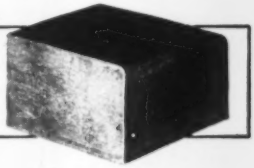
SAVE STEEL . . . MANPOWER . . . MACHINING WITH

DISSTON® HOT ROLLED SHAPES

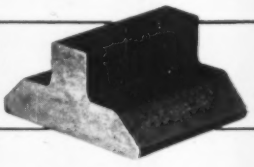
How Firestone Tire & Rubber Company saves 45.2% steel in making special jet engine container rims:



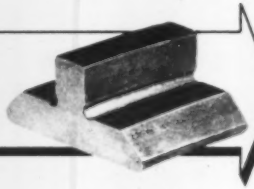
INSTEAD OF THIS—a full-section steel bar weighing 9.86 lbs. a ft. . . .

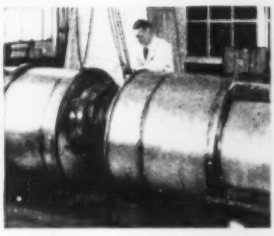


THEY* START WITH THIS—a Disston Shape, hot-rolled to close tolerances, weighing only 5.4 lbs. a ft. . . .



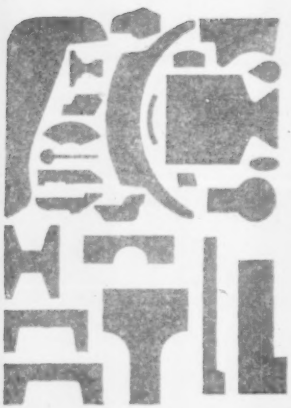
TO MAKE THIS—the finished rim weighing 4.14 lbs. a ft. Only 1.26 lbs. need be machined off each ft. of metal instead of 5.72 lbs.!





Firestone's jet engine container is in two halves which are attached by a series of clamps affixed to a machined rim. This rim is made from a special Disston Hot Rolled Steel Shape and helps make a joint capable of carrying structural loads.

*Machining and rim fabrication by Dresser Manufacturing Div., Bradford, Pa.



A few of the many forms of Disston Hot Rolled Shapes now being used by industry.

This actual case history demonstrates typical savings made for many industries using Disston Hot Rolled Steel Shapes. Such shapes can be rolled in a variety of forms to meet exact specifications. Tolerances are close, and fine finishes can be furnished. These shapes can be made in either alloy or carbon steels, in both electric and open hearth grades. Disston engineers and metallurgists will be glad to work with you in developing the special shapes that will give you the greatest economies. Write us, specifying your needs.

FIGHT WASTE

SCRAP TURNED IN IS STEEL TURNED OUT!

Steel mills urgently need more scrap now! Help yourself get more steel by keeping your scrap moving into channels serving steel mills.

HENRY DISSTON & SONS, INC.

1026 Tacony, Philadelphia 35, Pa., U.S.A.

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140‖		Carbon	Floor
New York (city)	6.27	7.29	8.44	6.59	...	6.42	7.29	9.25	6.40	6.58	8.04
New York(c'try)	5.97	6.99	8.14	6.29	...	6.12	6.99	8.95	6.10	6.28	7.74
Boston (city)	6.40	7.20	8.49	6.35	...	6.25	7.04	9.25	6.40	6.98	7.88
Boston (c'try)	6.20	7.00	8.29	6.15	...	6.05	6.84	9.05	6.20	6.78	7.68
Phila. (city)	6.15	7.05	8.25	6.35	...	6.30	7.11	8.90	6.15	6.30	7.40
Phila. (c'try)	5.90	6.80	8.00	6.10	...	6.05	6.86	8.65	5.90	6.05	7.15
Balt. (city)	5.80	7.04	8.27	6.24	...	6.24	7.09	...	6.34	6.00	7.64
Balt. (c'try)	5.60	6.84	8.07	6.04	...	6.04	6.89	...	6.14	5.80	7.44
Norfolk, Va.	6.50	...	...	6.70	...	6.55	7.70	...	6.60	6.50	8.00
Richmond, Va.	5.90	...	8.10	6.10	...	6.10	6.90	...	6.30	6.05	7.80
Wash. (w'hse)	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.)	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65††§	6.00	6.25	7.55
Buffalo (w'hse)	5.60	6.40	8.09	5.86	...	5.60	6.45	10.45††§	5.80	6.05	7.35
Pitts. (w'hse)	5.60	6.40*	7.75	5.65-5.95	6.90	5.55	6.40	10.10††	5.70	5.75	7.00
Detroit (w'hse)	5.45-5.78	6.53-6.80	7.99	5.94-5.95	7.75	5.84	6.56	8.91	6.09	6.19-6.35	7.28
Cleveland (del.)	5.80	6.60	8.30	5.89	7.10	5.77	6.60-6.70	8.91	10.02	6.12	7.82
Cleve. (w'hse)	5.60	6.40	8.10	5.69	6.90	5.57	6.40-6.50	8.71	5.82	5.92	7.12
Cincin. (city)	6.02	6.59	7.34	5.95	...	5.95	6.51	...	6.24	6.34	7.50
Chicago (city)	5.80	6.60	7.95	5.75	...	5.75	6.50	10.30	5.90	6.00	7.20
Chicago (w'hse)	5.60	6.40	7.75	5.55	...	5.55	6.30	10.10	5.70	5.80	7.00
Milwaukee (city)	5.94	6.74	8.09	5.89	...	5.89	6.74	10.44	6.04	6.14	7.34
Milwau. (c'try)	5.74	6.54	7.89	5.69	...	5.69	6.54	10.24	5.84	5.94	7.14
St. Louis (del.)	6.05	6.85	8.20	6.00	...	6.00	6.85	10.55	6.23	6.33	7.53
St. L. (w'hse)	5.85	6.65	8.00	5.80	...	5.80	6.65	10.35	6.03	6.13	7.33
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
KansCity(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city)	5.75	6.55	6.90‡	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm(w'hse)	5.60	6.40	6.75‡	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.05‡	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse)	6.35	7.90	8.85‡	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
San Francisco	6.65	7.80‡	8.90‡	6.60	...	6.45	8.20	...	6.45	6.50	8.60
Seattle-Tacoma	7.05	8.60‡	9.20‡	7.30	...	6.75	9.10	11.15	6.65	6.75	8.80

Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; *—500 to 1499 lb; ‖—450 to 1499 lb; ‖—3500 lb and over; ‖—1000 to 1999 lb.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail, freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit, del. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	17.00
Brazilian iron ore, 68-69%	24.00-25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-$1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.8c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00
South African Transvaal	
44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00
Brazilian	
44% 2.5:1 lump	$32.00
Rhodesian	
45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00
Domestic—rail nearest seller	
48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb, molybdenum content, mines	$1.00

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 21.75c per lb of contained Cr, c.l., packed 22.65c, ton lot 23.80c, less ton 25.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%.) Contract, carload, lump, bulk, max. 0.03% C 33.60c per lb of contained Cr, 0.04% C 31.50c, 0.06% C 30.50c, 0.10% C 30.00c, 0.15% C 29.75c, 0.20% C 29.50c, 0.50% C 29.25c, 1% C 29.00c, 1.50% C 28.85c, 2% C 28.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High Carbon: (Cr 62-66% C 5-7%.) Contract, c.l. S M x D, bulk, 23.25c per lb of contained Cr, C.l., packed 24.15c, ton 25.50c, less ton 27.25c. Delivered Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 2S-32%, C 1.25% max.) Contract, carload, packed, S M x D, 16.35c per lb of alloy; ton lot 17.2c; less ton lot, 18.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 21.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 21.90c per pound of contained chromium plus 12.60c per pound of contained silicon, F.o.b. plant; freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr 36-39%, Si 36-39%, Al 7-9%, C 0.05% max.) 21.75c per lb of contained silicon plus 12.4c per lb of contained silicon plus aluminum, 3" x down, delivered.

Chromium Metal: (Min. 97% Cr and 1% Fe) Contract carload, 1" x D; packed, max 0.50% C grade, $1.08 per lb of contained chromium ton lot $1.10, less ton $1.12. Delivered. Spot add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.00c per lb of contained Si; packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.40c per lb of contained Si, carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

Note: Current prices on zirconium, calcium and briquetted alloys appeared on page 269, Oct. 8 issue; manganese, titanium and "other" ferroalloys, page 149, Oct. 15. Refractories prices were published on page 269, Oct 8.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.) Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract,-carload, lump, bulk, 17.5c per lb of contained Si, carload packed 18.7c, ton lot 19.65c, less ton 20.7c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 20.0c per lb of Si, c.l. packed 21.2c, ton lot 22.1c, less ton 23.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe.) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 200 to 1999 lb 11.65c, smaller lots 12.15c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3.20. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max., C 0.20% max.) $3.30.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 65c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

TUNGSTEN ALLOYS*

Ferrotungsten: (70-80%), 10,000 lb W or more, $5.00 per lb of contained W 2000 lb W to 10,000 lb W, $5.10; less than 2000 lb W, $5.22.

Tungsten Powder: Carbon Reduced; (W 98.8% min.) 1000 lb or more, $6.00 per lb of contained W; less than 1000 lb W, $6.15.

*Government ceiling prices, effective May 7, 1951, f.o.b. Niagara Falls, N. Y., basis.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Oct. 22, 1951

STEELMAKING SCRAP COMPOSITE

Oct. 18	$44.00
Oct. 11	44.00
Sept. 1951	44.00
Oct. 1950	41.37
Oct. 1946	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and easter Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin, and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

No. 1 Heavy Melting Steel (Grade 1)	Dealer, Industrial	Railroad
Basing Point		
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Point, Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2. No. 2 Heavy Melting	—$2.00
3. No. 1 Bushelling	Base
4. No. 1 Bundles	Base
5. No. 2 Bundles	3.00
6. Machine Shop Turnings	—10.00
7. Mixed Boring & Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Bushelling	— 4.00
10. Cast Iron Borings	— 6.00

Elec. Furnace and Fdry. Grades

11. Billet, Bloom & Forge Crops	— 7.50
12. Bar Crops & Plate	— 5.00
13. Cast Steel	— 5.00
14. Punchings & Plate Scrap	— 2.50
15. Electric Furnace Bundles	— 2.00
Cut Structurals & Plate,	
16. 3 feet and under	— 5.00
17. 2 feet and under	— 5.00
18. 1 foot and under	— 6.00
19. Briquetted Cast Iron Borings	Base
Foundry Steel	
20. 2 feet and under	— 2.00
21. 1 foot and under	— 4.00
22. Springs and Crankshafts	— 1.00
23. Alloy Free turnings	— 3.00
24. Heavy Turnings	— 1.00

Special Grades

25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	—10.00
29. Shafting	—10.00
30. Hard Steel cut 2 ft. & under	— 5.00
31. Old Tin & Terne Plated Bundles	10.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively.

(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.

(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and open-hearth furnaces or foundries.

(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.

(6) Prices for Grade 30 may be charged only when sold to a gray iron foundry; otherwise price for Grade 20 will prevail.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.

(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.

(3) Ceiling price of any interior grade of scrap not listed shall not exceed the price of No. 1 heavy melting steel less $5.00.

(4) Deduction of not less than $1.50 per ton from ceiling prices is required where purchaser is required to load scrap on a transporting vehicle or f.a.s. vessel.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap.

2. No. 2 Heavy melting Steel	—$2.00
3. No. 2 Steel Wheel	Base
4. Hollow Bored Axles and loco. axles with keyways between the wheelseats	Base
5. No. 1 Bushelling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel and uncut wheelcenters	— 6.00
9. Uncut Frogs, switches	Base
10. Flues, Tubes & Pipes	— 8.00
11. Structural, Wrought Iron and/or steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	— 2.00
15. Rerolling Rails,	— 7.00
Cut Rails:	
16. 3 feet and under	— 5.00
17. 2 feet and under	— 6.00
18. 18 inches and under	— 8.00
19. Cast Steel, No. 1	— 3.00
20. Uncut Tires	— 2.00
21. Cut Tires	— 5.00
Bolsters & Side Frames:	
22. Uncut	Base
23. Cut	— 3.00
24. Angle, Splice Bars & Tie Plates	— 5.00
25. Solid Steel Axles	—12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	— 5.00
28. Spring Steel	— 5.00
29. Couplers & Knuckles	— 5.00
30. Wrought Iron	— 8.00
31. Fireboxes	— 8.00
32. Boilers	— 6.00
33. No. 2 Sheet Scrap	—13.00
34. Carsides, Doors, Car Ends, cut apart	— 6.00
35. Unassorted Iron & Steel	— 6.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise ceiling shall not exceed that for Grade 14.

(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise ceiling shall not exceed that for No. 1 heavy melting steel.

(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceed that for base Grade (No. 1.)

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:	
1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy. Breakable)	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	52.00
11. Drop Broken Machinery	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 3 cast iron.

(2) Ceiling shipping point price which any foundry (other than a malleable iron producer) may pay for Grade 9 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 1, No. 2 or No. 3, $8.

(2) For hydraulically compressing Grade No. 4, $6 per ton; Grade No. 5, $8.

(3) For crushing Grade No. 6, $3.

For preparing into:

(4) Grade No. 25, $6.

(5) Grade No. 19, $6.

(6) Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.

(7) Grade No. 17 or No. 21, $11.

(8) Grade No. 18 or No. 20, $12.

(9) For hydraulically compressing Grade No. 15, $8.

(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.

(2) For hydraulically compressing Grade No. 13, $6.

For preparing into:

(3) Grade No. 16, $4.

(4) Grade No. 17, $5.

(5) Grade No. 18, $7.

(6) Grade No. 21, $4.

(7) Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into grade No. 7, $8.

(2) For preparing Grade No. 3 into Grade No. 11, $7.

(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commission shall be payable to a broker in excess of $1.

Unprepared Scrap

For unprepared scrap, other than materials suitable for hydraulic compression, ceiling basing point prices shall be $8 per ton beneath ceiling of the prepared base grades.

For unprepared material which when compressed constitutes No. 1 bundles, ceiling basing point price shall be $6 per ton beneath ceiling for No. 1 bundles; or when compressed constitutes No. 2 bundles ceiling basing point price shall be $8 beneath ceiling basing point price for No. 2 bundles.

Premiums for Alloy Content

No premium may be charged for alloy content except $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and non-operating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

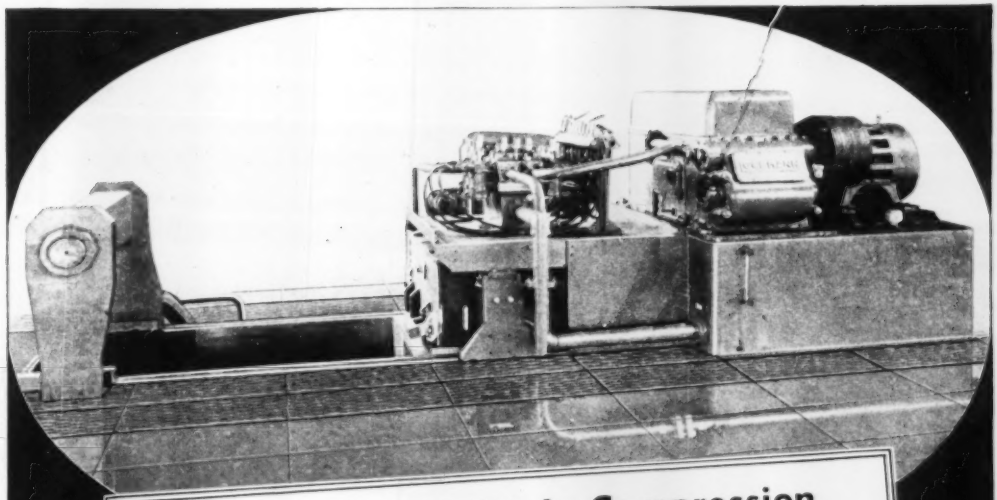
Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 54c; Bethlehem, Pa., 42c; Birmingham, 50c; Brackenridge, Pa., 43c; Buffalo, 53c; Butler, Pa., 63c; Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 58c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c; Coatesville, Pa., 50c; Conshohocken, Pa., 29c; Detroit, 93c; Duluth, Minn., 50c; Harrisburg, Pa., 51c; Houston, 57c; Johnstown, Pa., 54c; Kansas City, Mo., 78c; Kokomo, Ind., 51c; Middletown, O., 26c; Midland, Pa., 73c; Minnequa, Colo., 51c; Monessen, Pa., 54c; Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 36c; Portland, Oreg., 52c; Portsmouth, O., 51c; St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 73c; Sparrows Point, Md., 29c; Steubenville, O., 51c; Warren, Pa., 75c; Weirton, 70c; Youngstown, 73c.

HAMILTON, ONT.

(Delivered Prices)

Heavy Melt.	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	34.00
Mechanical Bundles	33.00
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	28.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Bushelling	29.50
Bushelings new factory:	
Prep'd.	33.00
Unprep'd.	28.00
Short Steel Turnings	28.00
Cast Iron Grades*	
No. 1 Machinery Cast	58.00-60.00

* F.o.b. shipping point.



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The purpose of this new, 52-page book is two-fold. It describes the major uses of lead, its alloys and compounds plus the various properties which, either singly or in combination, make the respective lead product the logical choice for these applications. To this end, the book has been divided into two parts. The principal properties of lead and related data – gathered from metallurgical papers, technologists in lead producing and consuming industries, textbooks, as well as the research files of the St. Joseph Lead Company's laboratories, and various other sources of information – have been compiled in Part I. The major applications of lead – based on these properties – are covered in Part II. This book should therefore not only serve as a ready reference on the properties of lead, some of its alloys and compounds, but will also show the extent to which these properties are responsible for the use of lead in its various applications.

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The Metal Market

Conservation of strategic materials must be intensified as military requirements mount rapidly. First-quarter use of aluminum and copper in some products to be cut drastically

CONSERVATION of strategic materials is becoming an increasingly important program of industrial plants. With the defense program continuing to gain momentum, it will become imperative for you to find means of stretching available steel supplies over longer production runs.

Contracts for thousands of tons of barbed wire were placed recently by the Corps of Engineers. A large tonnage of zinc will be diverted from less essential production to this and other defense requirements. Military uses of basic materials is growing rapidly and civilian production in the first quarter will be lower than in the last quarter of this year. Certain less essential products requiring aluminum and copper, including those where substitution is possible, will have to be curtailed drastically. The direct military demand for copper in the first quarter is 81 million pounds more than in the fourth quarter; for aluminum, 80 million pounds more.

Allotments Top Supply—In order to bring first-quarter demand for copper products in balance with supply, Defense Production Administration allotted 1,367,000 pounds of copper products to the various claimant agencies, or about 110 per cent of the estimated supply. Total stated requirements of the claimant agencies for copper products amounted to 2,083,000 pounds, or 161 per cent of supply.

In balancing demand for aluminum with supply, DPA authorized issuance of CMP allotments for 713,566,000 pounds, including self certification reserves. The CMP authorizations amount to about 110 per cent of the supply, allowing 10 per cent for attrition. Total stated requirements of the claimant agencies amounted to 974 million pounds. The estimated supply is 646 million pounds.

Aircraft manufacturers have found that conservation programs pay handsome dividends, says Aluminum Association, New York.

A large manufacturer of household appliances reports savings of over $1.5 million a year in the conservation and salvage of such materials as aluminum, copper, brass, nickel and steel.

Contest Spurs Campaign — Many companies with established conservation programs have intensified their programs. A large manufacturer of electrical equipment, for example, recently ran a contest to stimulate employee's interest in conservation.

The benefits of conservation are by no means limited to big companies. Smaller users of strategic materials can realize proportionate economies.

A sound conservation program involves two things: Efficient use of all available supplies; careful salvage of all scrap. To accomplish the former objective all employees must be made conservation-minded and must be kept thoroughly imbued with the conservation idea for continuing benefits. Designers should be urged to make the most efficient use of materials in drawing up their specifications, and production workers should be shown how good workmanship will keep rejects at a minimum.

A good quality-control setup also will help conserve materials. Vigilant quality-control personnel can spot manufacturing difficulties promptly and effect corrective measures before large volumes of rejects have been piled up.

Plant personnel also must be instructed thoroughly in the proper handling of scrap, if the greatest benefit from the conservation program is to be realized. Scrap that is carefully segregated by type of alloy and kept clean and free of foreign materials yields better returns than unsegregated or dirty scrap.

Lead, Zinc Scrap To Rise

An upward revision of ceiling prices for lead and zinc scrap will be authorized by the Office of Price Stabilization at an early date. This action will keep ceiling scrap prices in the same relationship with primary lead and zinc prices as had existed prior to Oct. 2 when OPS authorized increases in the latter ceilings.

In forthcoming orders, OPS will revise applicable regulations to take account of increased costs for lead and zinc in the case of certain commodities and services where lead and zinc comprise a substantial part of the total materials cost.

No action is comtemplated by OPS with respect to any upward revision of ceiling prices for primary copper, copper and copper alloy scrap, brass mill scrap, brass mill products, or aluminum scrap.

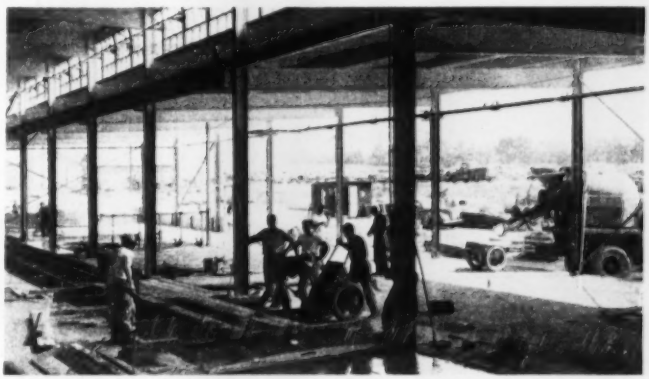
Reynolds To Build Plant

Reynolds Metals Co., Louisville, will construct additional facilities for producing primary aluminum, increasing its capacity 60,000 tons per year. The company will finance this expansion by the use of private capital with General Services Administration offering a procurement contract and guarantee of such loans as might be required.

GSA's letter of intent carries a provision for the construction of additional alumina facilities to the extent of 1000 tons of alumina per day capacity.

Copper Stocks Decline

Stocks of refined copper in the United States dropped 8844 tons in September to only 62,093 tons, reports the Copper Institute, New York. Reflecting the recent strike in the industry, production of refined metal dropped to 74,104 tons compared with production of 113,513 tons in May. Production from secondary sources practically disappeared amounting to only 1625 tons and reflecting the acute shortage of scrap. Deliveries to fabricators increased, however, to 121,629 tons from 104,938 tons in August. These deliveries include tonnages delivered from government stocks.



ALL THIS AND 850 FEET: Looking most like an ultra-modern industrial plant, the Friedensville, Pa., location of New Jersey Zinc Co. actually will be a zinc mine and flotation mill, producing zinc concentrates. The shops building will receive equipment for repair by rail car. A track running from the head of the mine shaft through the entire length of the building. A 5-ton overhead crane is to be installed for handling heavy equipment. Also to be contained in surface buildings are the flotation mill, hoisting equipment, supply section, change house, dispensary and offices

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley, Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 38.50c; 80-10-10 (No. 305) 32.25c; No. 1 yellow (No. 405) 20.25c.

Zinc: Prime western 19.50c; brass special 19.75c; intermediate 20.00c. East St. Louis, high grade 20.50c, delivered.

Lead: Common 18.80c; chemical 18.90c; corroding 18.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c; pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades (notched bars, granulated or shot) Grade 1, 18.00c; grade 2, 17.75c; grade 3, 17.25c; grade 4, 16.50c.

Magnesium: Commercially pure (99.8%); standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 105.00.

Antimony: American 99.50% and over but not meeting specifications below 42.00c; 99.5% and over (arsenic 0.05% max.; other impurities 0.4% max.) 42.50c, f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 56.50c; 2-6" 99.5% "XX" nickel shot, 60.15c; 6" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, New York, $215-$221 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b. Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97.99%, $2.40 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 88.40c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill, effective Aug. 25, 1951)

Sheet: Copper 41.68; yellow brass 38.28; commercial bronze, 95% 41.61; 90% 41.13; red brass, 85% 40.14; 80% 39.67; best quality, 39.15; nickel silver, 18% 53.14; phosphor-bronze grade A, 5% 61.07.

Rod: Copper, hot-rolled 37.53; cold-drawn 38.78; yellow brass free cutting, 32.63; commercial bronze, 95% 41.30; 90% 40.82; red brass 85% 39.83; 80% 39.36.

Seamless Tubing: Copper 41.72; yellow brass 41.29; commercial bronze, 90% 43.79; red brass, 85% 43.05.

Wire: Yellow brass 38.57; commercial bronze, 95% 41.90; 90% 41.42; red brass, 85% 40.43; 80% 39.96; best quality brass 39.44.

(Base prices, effective Nov. 6, 1950)

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 28.67-30.42; l.c.l. 29.17-30.92; 100,000 lb lots 28.545-30.295, weatherproof, f.o.b. eastern mills, c.l. 29.60-30.60, l.c.l. 30.10-31.10; 100,000 lb lots 29.53-30.53, magnet, del., 10,000 lb or more 34.50c, l.c.l. 35.25c.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 28 and 38 mill finish c.l.

Thickness	Widths or Diameters, Inches	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	....	....
0.135-0.096	12-48	30.6	....	....
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012"	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (dist. or d. across flats	Round R317-T4, 178-T4	Round R317-T4	Hexagonal 178-T4
0.125	52.0	....	....
0.156-0.0188	44.0	....	....
0.219-0.313	41.5	....	....
0.375	40.0	46.0	48.0
0.406	40.0	....	....
0.438	40.0	46.0	48.0
0.469	40.0	....	....
0.500	40.0	46.0	48.0
0.531	40.0	....	....
0.562	40.0	....	45.0
0.594	40.0	....	....
0.625	40.0	45.5	45.0
0.688	40.0	....	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	....	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	....	....
1.625	36.5	....	39.5
1.688-2.000	36.5	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh). Sheets: Full rolls, 140 sq ft or more $22.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $22.00 per cwt. Traps and bends: List prices plus 60%.

ZINC

Sheets, 24.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils 25.00c, f.o.b. mill, 36,000 lb and over. Plates not over 12-in., 23.50-24.50c; over 12-in., 23.50-24.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 44.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

DAILY PRICE RECORD

1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Oct. 5-18	24.50	18.80	19.50	103.00	19.00	42.00	56.50	88.00
Oct. 4	24.50	18.80	19.50	103.00	19.00	42.00	56.50	84.75
Oct. 2-3	24.50	18.80	19.50	103.00	19.00	42.00	56.50	90.16
Oct. 1	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Sept. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Aug. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
July Avg.	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June Avg.	24.50	16.80	17.50	117.962	19.00	42.00	56.50	85.492
May Avg.	24.50	16.80	17.50	139.923	19.00	42.00	56.50	90.16
Apr. Avg.	24.50	16.80	17.50	145.735	19.00	42.00	56.50	90.16
Mar. Avg.	24.50	16.80	17.50	145.730	19.00	42.00	56.50	90.16

NOTE: Copper, Electrolytic del. Conn. Valley. Lead, common grade del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits del. New York. Aluminum primary ingots, 99% del. Antimony, bulk, f.o.b. Laredo, Tex. Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound, except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb, f.o.b. shipping point, freight allowed: Flat, rolled, 38.50c; oval 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb, 75.50c; 5000 to 10,000 lb, 76.50c; 500 to 5000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb, 82.50c; f.o.b. Cleveland.

Nickel Chloride: 26.50c in 100 lb bags; 34.50c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 77.7c; 100 or 350 lb drums only, 100 to 600 lb, 63.1c; 700 to 1000 lb, 60.6c; 2000 to 9000 lb, 58.8c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.19; 500 to 999 lb, $1.195; 200 to 499 lb $1.20; less than 200 lb, $1.215. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c; 10 or more drums, 45.7c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.0069; more than 2000 lb, 98.69c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 87.23c; 100 lb kegs 88.23c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.625
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	19.75
Phos. bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 10,000 lb f.o.b. point of shipment)

Group 1: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass 17.00 per lb of dry Cu content plus 50 to 60 cents per cwt material and 17.25 per lb for over 66 per cent material.

Group II: No. 1 soft red brass solids 19.50; No. 1 composition borings 19.25 per lb of Cu content plus 83 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 78 cents per lb of tin content; unlined red car boxes 19.25; lined red car boxes 18.25; cocks and faucets 16.75; mixed brass screens 16.00; zinc bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

Unsweated zinc dross, 12.25c; new clippings and trimmings, 14.50c; engravers' and lithographers' plates, 14.50c; die cast slabs, minus 90% zinc, 12.25c; old zinc scrap, 11.25c; forming and stamping dies, 11.25c; new die cast scrap, 10.75c; old zinc die cast radiator grills, 10.50c; old die cast scrap, 9.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 17.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 5,000 lb or more, less 2.25c in lots 1c to 5,000 lb. Used storage batteries (in boxes) drained of liquid, 6.60c for 15,000 lb or more; 6.80c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap, or lead content of lead-covered cable scrap, 15.25c per lb. In addition, brokerage commissions are permitted.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50. Mixed plant scrap: Copper-free solids, 10.00 dural type, 9.00; Obsolete scrap: Pure old cable, 10.00; steel and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

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Sheets, Strip . . .

Sheet and Strip Prices, Page 129 & 130

Boston—Straight chromium stainless steel strip is expected to be available in the first quarter in about the same volume as in the fourth quarter, but nickel-bearing stainless strip will be limited largely to highly rated defense requirements. Some consumers may not specify fully against straight chromium grades due to shortages of copper and other nonferrous metals. They do not want to extend stainless inventory too far beyond the availability of these metals. To some extent this situation applies also to silicon flat-rolled steel. Volume of unshipped third-quarter strip tonnage to apply against fourth quarter allotments varies, the tonnage reported by nonintegrated producers being small. While direct strip buying for defense is heavier, there are some soft spots in civilian lines, notably shoe shank steel.

High-carbon cold-rolled strip orders for clip steel, Springfield Armory, are heavier, 550 tons having been placed with Washburn Wire Co., Phillipsdale, R. I., and 370 tons with Wallingford Steel Co., Wallingford, Conn. Thousands of tons of hot-rolled heavy-gage strip are required for barbed wire fence posts placed with 11 fabricators, including Franklin Mfg. Co., Providence, R. I.

New York—Straight chrome in strip mill sizes is one of the few items in relatively easy supply. One large producer is still able to accept shipments for December. More and more of this material is being used for the substitution of nickel bearing alloys. Some leading producers are bringing out booklets outlining some of the applications which have and are proving successful with regard to straight chrome.

Philadelphia—While there has been relatively little in the way of steel cancellations, some producers, having diversified lines, say perhaps there have been more cancellations in sheets than in other major products. At least early this month there wasn't quite the movement to have the tonnage on which the mills were in arrears re-certified against fourth quarter allotments that there was in plates, shapes and bars.

Pittsburgh—Cancellation of unfilled third quarter tonnage has been slight in this district. Until cancellations are received by the mills in larger volume than to date the mills will not know what tonnage can be made available to care for unfilled fourth quarter CMP tickets. Producers are shipping until advised otherwise by the customer, upon whom responsibility rests for cancellations. No new prices have been effected on galvanized sheets as yet to reflect the recent increase in the price of zinc.

Cleveland — Situation in the light flat-rolled products is unchanged from that of recent weeks with distribution still messed up in the red tape of government controls. Relatively little tonnage has been cancelled out as result of the NPA regulation that third quarter carryover tonnage after Oct. 7 be charged by consumers against fourth quarter allotments. In several instances December tonnage has been cancelled, however, largely reflecting cutbacks in the particular manufacturers' production schedules. Producers are booking actively for first quarter and indications are supply conditions will be just as tight in that period as at present, though better balance between supply and allocations is expected. Some makers anticipate easing in conditions in second quarter with substantial additions to rolling facilities scheduled to come into operation about that time.

Cincinnati — Sheet mills have no openings in fourth quarter schedules for unplaced CMP tonnage, the cancellations being infrequent and in minor volume.

Chicago—First quarter quotas for hot and cold-rolled sheets and galvanized products have been fully booked by one sheetmaker here. Except for military direct defense and directive tonnage acceptances for second and third quarter are being deferred.

Birmingham — Sheet producers do not anticipate any fourth quarter cancellations. As matters stand now, they are engaged wholly with "must" tonnage and say there is no such thing as free sheets.

Plates . . .

Plate Prices, Page 129

New York—Plate consumers are finding few openings for such CMP tickets as they still have this quarter. There may be slight openings in mill schedules for December as a result of ship and freight car cutbacks, but there is little that can be counted on definitely.

Philadelphia—Cutbacks in the shipbuilding program may result in release of some plate tonnage which had been set aside for December rolling. How much, however, remains to be seen, and whatever the amount, it apparently will not be enough to relieve conditions.

Boston—With first quarter allotments substantially lower in many instances, plate distribution for that period is being assigned. Including cuts in the fourth quarter, tonnage for the first quarter is frequently around 50 per cent of what was allocated by CMP for the third quarter.

Pittsburgh — Plates continue in tight supply. Little relief is anticipated due to extremely light consumer cancellations of third quarter carryover tonnages not shipped by Oct. 7. Fabricators are hard-pressed for more steel but are having no success in finding any open mill tonnage in the area. Some consumers are running into production difficulties due to producers allotting respective orders over numerous rolling mills.

Chicago—A local platemaker has filled its first quarter quotas on plates. It is not booking beyond that except on direct defense requirements.

Birmingham—Pressure for plates continues. Available supplies are being spread as far as possible in the face of CMP, which makes virtually the entire output directive.

Los Angeles—Government directives with nearby delivery dates for large tonnages of plate have caused huge carryover of plate orders at Kaiser Steel Corp.'s Fontana mill. Kaiser hopes to be current with commitments by Jan. 1, directives permitting.

Wire . . .

Wire Prices, Page 131

Boston—Production of galvanized sheet and tubular products will be curtailed sharply to conserve zinc for thousands of tons of barbed wire placed by the Corps of Engineers, St. Louis, for relatively prompt delivery. The tremendous tonnage was distributed among 13 producers. Relatively little heading wire has been scheduled definitely for first quarter, although allotments are expected to approximate the volume placed for delivery in the last three months. Heading wire tickets might be increased should screw procurement for defense, notably aircraft, increase to balance losses in civilian durable goods.

Pittsburgh — Wiremakers that advanced galvanized wire prices in line with the sliding scale adjusted to the price of zinc are reported to have temporarily withdrawn these increases pending determination of policy in consultation with Office of Price Stabilization. Heretofore, there has been no question of an automatic increase in galvanized product prices when zinc moved upward 2 cents per pound, which it did early this month. Consequently, several producers acted to automatically raise their galvanized wire prices. OPS appears to have questioned this action, and, pending settlement of the issue, the increases reportedly are being held in abeyance.

Birmingham—There has been no tapering off in overall demand for wire products, but there have been shifts from one specification to another. Scarcity in nails continues.

Tin Plate . . .

Tin Plate Prices, Page 130

Pittsburgh—Some speculation is encountered here with respect to action on contract tin plate prices for 1952. Normally, the contract price is determined for the succeeding year late in November. This permits the can companies to arrive at firm can price schedules. Today, however, the question arises whether any change in practice is likely under government price control.

Generally, the trade thinks not, though apparently notification must be given OPS of a contemplated change 20 days prior to its effective date. In the case of tin plate, however, since the effective date of the change is Jan. 1, a 20-day delay would be of little inconvenience in the case of a price determined upon in November.

With the tin price slightly lower currently as compared with a year ago some thought is being given in the trade as to whether this will be reflected in the new tin plate contract price. Producers point out other cost increases more than offset the decline in tin, and these increased costs will figure in determining the new plate price just as in the past. Further, the contract tin plate price for the year ahead reflects the best judgment of those in charge of pricing as to what the average cost of production will be over the year, and this takes into consideration possible fluctuations in the price of tin.

Currently, demand for tin plate is strong with the mills booked full.

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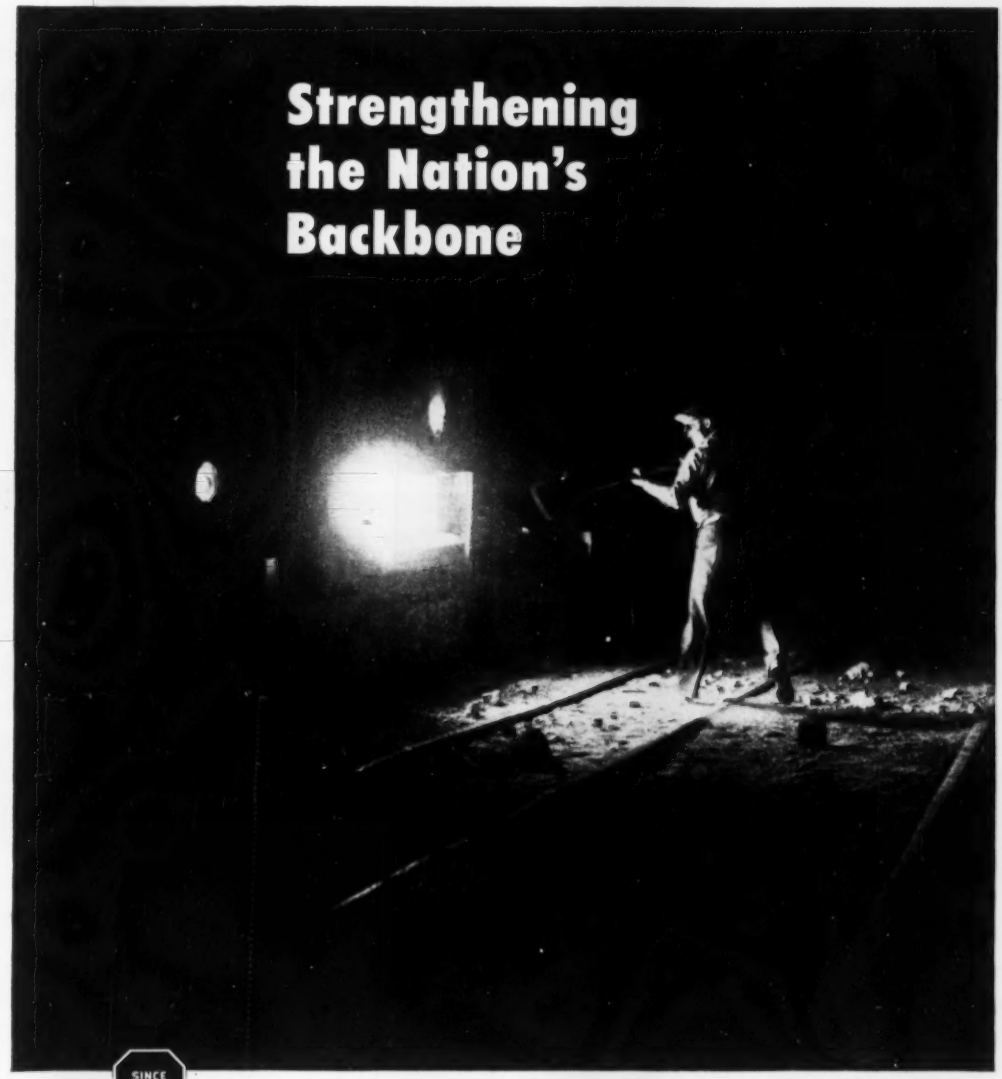

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Steel Bars . . .

Bar Prices, Page 129

Cleveland—Bars appear to be in tightest supply position of the major products in this district. This is accounted for by the fact that direct military needs, in both carbon and alloy grades, have been rising steadily. As a result producers are unable to accommodate promptly all the orders placed with them, resulting in month-to-month carryover. NPA's recent order that all unshipped third quarter tonnage after Oct. 7 be charged by the customer against fourth quarter allotments does not appear to have resulted in any appreciable order cancellations.

New York—Apart from cold-drawn, bar sellers have taken no general action in opening books for second quarter. On specially rated defense requirements, orders are being booked for April shipment and beyond, but to date this business has been relatively small. Consumers who have been unable to place their CMP tickets for this quarter are obtaining little relief because cancellations have been light.

Philadelphia—Most bar producers had substantial carryover from third quarter and despite the fact much of the rated work of consumers will be applied to current allotments, producers expect quite a carryover at the beginning of next year.

Semifinished Steel . . .

Semifinished Prices, Page 129

Pittsburgh—Extent to which conversion steel market activities will be affected by the latest regulation of NPA is uncertain. Generally, the trade views the action as at least clarifying the situation for buyers who have depended to considerable extent on conversion steel. Under direction 1 to CMP regulation 1 consumers with allotments for a given quarter may purchase conversion steel in carrying out authorized production schedules. The buyer can make arrangements for obtaining semifinished for shipment to a converter for processing into finished products. Thereafter, however, the finished product tonnage must be charged by the consumer against his quarterly steel allotment. No buyer, in making conversion arrangements, is permitted to order conversion steel beyond the amount required for processing into finished products in the amount allotted him by NPA. One exception in this latter regard applies to semifinished steel purchased for conversion and produced prior to Oct. 1.

Tubular Goods . . .

Tubular Goods Prices, Page 133

Pittsburgh—Recently announced increases on galvanized pipe of from $1 to $4 per ton have been temporarily withdrawn by the several producers who earlier this month announced upward revisions in their schedules to offset the 2 cents per pound increase in the price of zinc which went into effect Oct. 2.

Ordinarily, the passing along of higher zinc costs through price advances on galvanized products is more or less automatic. However, it appears under Office of Price Stabilization regulations increases of this kind cannot be effected until 20 days after producers have notified OPS of proposed changes in schedules.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 129

Los Angeles—Navy will put out for bid $194 million worth of naval facility improvement projects in southern California.

Structural Shapes . . .

Structural Shape Prices, Page 129

Boston—Competition for fabricated structural steel contracts is developing as restrictions on construction reduces the volume of new work coming out for estimates. Easing in prices is moderate with nearer deliveries commanding the highest quotations. Tonnage wanted within four months must come largely from stock.

Philadelphia—Government restrictions are reflected in scattered awards, mostly for approved industrial and bridge projects. Also, restrictions are reflected in better delivery promises from fabricators, although backlogs are still well extended.

Pittsburgh—District fabricators report allotments of wide flange beams have been cut down to the point where it is working definite hardships in their schedules. All types of structurals continue in extremely tight supply with no immediate improvement anticipated. Material slated for October delivery has been set back to December for one large fabricator.

Chicago—Much city, country and state highway and bridge construction is being held up or deferred by inadequate supply of structural steel. This is causing much shifting in planning and repercussions will be felt for a long time to come.

Los Angeles—Rejection of fourth quarter allotments by NPA include largest commercial construction projects pending in this district: $5.3 million, Columbia Broadcasting television center; $3 million, Juvenile Hall addition; and $3 million, Sears, Roebuck & Co. department store. Kaiser Steel Corp. started production of 8-18 inch wide flange structural steel beams—the first ever produced in the Far West.

Rails, Cars . . .

Track Material Prices, Page 131

New York—Car inquiry is sustained at recent levels. Since Defense Production Administration is allocating 12 per cent of available steel for first quarter to direct military production, there will be a further shrinkage in amount of steel for car construction. Car builders will be given sufficient steel in that period to produce 6000 freight cars per month, plus a total of 2000 tank cars and 1500 cars for industrial and export use during the quarter as a whole. Originally the carbuilding program called for enough steel to build 10,000 cars monthly.

Philadelphia—Pennsylvania railroad has closed on 100,000 tons of 1952 rail to United States Steel Co., Pittsburgh, Bethlehem Steel Co., Bethle-

hem, Pa., and Inland Steel Co., Chicago. How the tonnage is divided was not announced, but normally the split among these producers is at a ratio of about 50, 44, and 6 per cent, respectively.

Iron Ore . . .

Iron Ore Prices, Page 135

Cleveland—Shipments of Lake Superior iron ore declined for the fourth consecutive week in the period ended Oct. 15, reflecting normal seasonal factors. The movement came to 2,468,842 tons compared with 2,836,839 tons for the like week a year ago, reports the Lake Superior Iron Ore Association, this city. Cumulative total for the season through mid-October is 76,814,290 tons compared with 64,334,815 tons for the like period a year ago. The increase for the season from United States ports alone is 12,176,247 tons. This heavy ore traffic assures mills of adequate supplies to cover needs during the winter months.

Pig Iron . . .

Pig Iron Prices, Page 128

Boston—Most pig iron consumers are getting enough iron to fill requirements; some shops have as much inventory as is permitted and are canceling shipments. As a result, the district furnace is stockpiling some iron. Most foundries could accept more business, notably in the jobbing end. Demand for castings from machine tool makers is heavy, but losses in civilian durable goods have not been balanced by defense orders.

Philadelphia—Some quickening of interest in import iron for next year is noted. Little improvement in domestic supply is anticipated, and consumers who have leaned to some extent on imports to round out requirements and who may have been reasonably protected for the remainder of this year, are beginning to realize that the new year, in terms of getting foreign tonnage lined up, is not too far away. Meanwhile, a fair amount of tonnage is coming in from abroad.

Pittsburgh—Merchant iron demand is stronger with inquiries still coming from outside the district. Some foundries are getting adequate iron, but could use more to replenish their inventories. Others see trouble ahead if the casting business improves. Some foreign iron is finding its way into this area. Gray iron business has lagged somewhat recently.

Cleveland—Some relief in the tight pig iron supply situation in this area is expected around Nov. 1 when an idle stack of American Steel & Wire Co., down for repairs since September, is expected to come back into production. Loss of this stack's output is keenly felt here and some foundries have been inquiring for tonnage at distant points. In the main, supplies are adequate to support current foundry schedules with sellers distributing available tonnage as equitably as possible. Few foundries are able to build substantial stocks.

Birmingham—Merchant iron producers anticipate a steadily mounting demand for their product as the defense program broadens. This indicates that CMP will shuffle allocations and that uncertified users will be worse off than ever.

Seattle—The larger foundries in this area are well booked, much of it for defense projects; operations at the smaller plants are declining. As a whole, operations are about 75 per cent of capacity. Domestic pig iron is practically out of the market and imported pig is being used, one local plant having 100 tons enroute from Germany. South African producers have withdrawn from foreign sales.

Manganese Ore . . .

Washington—A depot has been opened at Butte, Mont., to which miners and producers may ship domestic manganese ore for inspection and purchase by the government. Arrangements are being made to open another depot at Deming, N. Mex., in conjunction with the government's five-year purchasing program to encourage production of manganese.

The ore delivered at the Butte depot must contain a minimum of 12 per cent manganese in order to be acceptable under regulations. Five long tons of ore is the minimum that will be accepted in a single delivery. It will be purchased only from miners and producers who have notified the government in advance of their intentions to take part in the program.

Prices paid for the ore will be determined by the manganese content. At Butte, the payment will range from $6.05 per long dry ton for ore with the minimum acceptable 12 per cent manganese content to $40.42 for ore containing 30 per cent.

Warehouse . . .

Warehouse Prices, Page 135

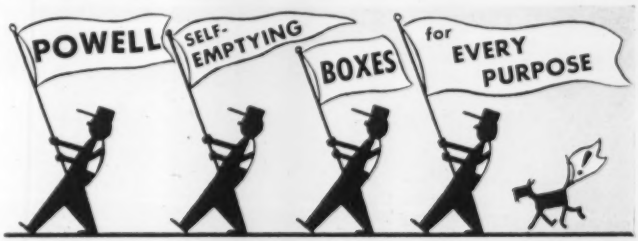
Pittsburgh—District warehouse inventories are declining. Items in tightest supply, are structurals and hot-rolled bars. Receipts were disappointing last month, but operators believe the situation will ease somewhat after the first of the year when 100 per cent of base period receipts will be allowed. Many are operating on a day-to-day basis.

Cleveland—District warehouse operators do not anticipate much change in steel supply conditions until well into next year. Increase in their quota to 100 per cent of their receipts in the base period is seen as eventually improving their supply position. However, this increase, 15 per cent, does not become effective until first quarter next year. Meanwhile, distributors are serving their customers as equitably as possible, but unbalanced stocks are forcing some buyers to shop around considerably in filling needs.

Chicago—Warehouses are experiencing more demand than limited inventories will accommodate. Tightest items are structurals and cold-finished products.

Birmingham—Warehouse steel shipments are limited only by receipts from mills, most of which never finds its way to the shelf stage.

Seattle—Warehouse stocks continue to decline under pressure of strong demand. Under new allocation directives, the situation is expected to improve. Shortages are apparent in practically all stock items.



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Scrap . . .

Scrap Prices, Page 136

Washington — No substantial changes in the general level of scrap prices is expected to result from amendments to the ceiling price regulation which become effective Oct. 22.

A ceiling price of $5 above the applicable basing point price for a new grade of scrap of dealer and industrial origin (Grade 30, hard steel cut 2 feet and under) is established. This ceiling will apply only when this grade is sold to a gray iron foundry; otherwise, the ceiling price for Grade 20 will prevail.

Another new grade of dealer and industrial origin is listed as Grade 31 (old tin and terne plated bundles) with a ceiling of $10 below the applicable basing point price.

A specific ceiling for a new grade of railroad origin scrap is listed as Grade 35 (unassorted iron and steel scrap) with a ceiling of $6 below the applicable basing point price. Generally, this grade consists of car, locomotive and track scrap. Previously, railroads applied to OPS for ceilings on this type of scrap.

A new provision requires a deduction of not less than $1.50 a ton from the applicable ceiling price where the purchaser is required to load scrap on a transporting vehicle or f.a.s. vessel.

Other miscellaneous provisions permit application of the ceiling for No. 1 bundles to detinned scrap delivered during the period Feb. 7 through Apr. 23, 1951; modification of provisions determining ceiling "on-line" price of steel scrap; granting government agencies an option on determining weights; and a change in the definition of iron and steel scrap, definitely excluding tool steel and stainless steel scrap from provisions of price regulation No. 5.

Boston—Inventories of steel scrap are dangerously low, resulting in curtailment of open-hearth operations despite allocations of material. Allocations against dealer stocks, which are low, are made only to meet emergencies. Electric furnaces also are having trouble in securing enough scrap. Activity in cast grades is slow and spotty with inventories generally adequate to meet current requirements.

New York—Scrap brokers continue to be beseiged with telephone and telegraph requests from the mills for steel grades. Some steelworks now are operating on no more than a day-to-day scrap supply basis.

Buffalo—An easier tone prevails in the scrap market here even though the mills are only holding their own as regards supplies. Any substantial expansion in mill reserves would probably lead to a revival in allocations of material to other points.

Philadelphia—Establishment of major open hearth grades on a single price basis, such as was done in World War II, appears imminent. Whether or not the proposed price will be at the No. 1 heavy melting steel level is not known, but in any event it is believed the action will contribute to a better flow of steelmaking scrap.

Pittsburgh—Nip and tuck battle continues here by the steelmakers seeking adequate scrap inventories to support high level steelmaking operations. Some works hold better stocks than others, but overall supplies fall short of needs. Scrap is being brought in from long distances and consumers are not too particular as to quality.

Detroit—Scrap brought out of hiding by organized groups is helping this area's supply somewhat. The automotive industry has contributed 44,000 tons over and above its production scrap since the drive began. Bad news out of Washington on next quarter's auto production, however, indicates production scrap generation will go down further before defense plants start contributing in any volume.

Cincinnati—Cast scrap market is stronger as the result of a near-balance in supply and demand. The situation in steelmaking grades is unchanged, brokers and dealers looking forward to a tense struggle to maintain the melt during winter months.

Chicago—Scrap circles are disappointed that OPS adjustments in price regulations contained in amendment 4 CPR 5 effective Oct. 22 do not establish a single price for major open-hearth grades as recommended by the industry. Instead the adjustments are minor. Feeling exists that some holding back of open-hearth material is going on in expectation of price unification although brokers maintain material is flowing on schedule. Little improvement in overall flow is resulting from scrap drives.

Birmingham — Some tonnage has appeared as a result of the current drive to get out scrap, but the volume has been disappointingly small.

Seattle—Increased efforts are being made to meet the demands of mills which are consuming far more than normal quantities of scrap. Receipts continue to equal amount consumed.

Fluorspar . . .

Fluorspar Prices, Page 133

Washington — Domestic production of acid grade fluorspar will be increased by 100,000 tons during the next five years under an agreement reached by the Defense Minerals Procurement Agency and Ozark-Mahoning Mining Co., Tulsa, Okla. The fluorspar will come principally from the company's mine at Northgate, Jackson county, Colorado.

DMA has agreed to buy all acid grade fluorspar concentrates produced by the new facilities that the company cannot sell to other purchasers in the United States at $60 a short ton. The amount the government will pay is to be determined by the market price quoted on the day prior to delivery, or $60 a ton, whichever is higher.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

4060 tons, Forest Hills overpass, Boston, to Grosser & Shinger Iron Works, Somerville, Mass., and West End Iron Works, Cambridge, Mass.; through Taurasi Construction Co., Somerville.

3000 tons, pulp mill construction and expansion in Washington and Oregon to Bethlehem Pacific Coast Steel Corp., Seattle.

2800 tons, warehouses, Army, New Cumberland, Pa., to Bethlehem Steel Co.

1500 tons, nylon plant, near Pensacola, Fla., Chemstrand Corp., placed through the Du Pont interests, to Belmont Iron Works, Eddystone, Pa.

600 tons, Alaska Railroad shops, Anchorage; material furnished by government, fabrication, processing and erection to Isaacson Iron Works, Seattle.

585 tons, general warehouse, Corps of Engineers, Springfield, Mass., to Bethlehem Steel Co. through George B. H. Macomber Co., Boston, general contractor.

350 tons, government powerhouse, Whittier, Alaska, to Isaacson Iron Works, Seattle; Haddock Engineers, Seattle, general contractors.

300 tons, classroom building and dining hall, Harvard Business School, Cambridge, Mass., to Grosser & Shlager Iron Works, Somerville, Mass., through Turner Construction Co., Boston, general contractor.

100 tons, state highway bridge, East Hartford, Conn., to Phoenix Bridge Co., Phoenixville, Pa., through D. V. Frione Co., New Haven, Conn., general contractor.

100 tons or more, two warehouses, Quartermaster Depot, Richmond, Va., to Richmond Structural Steel Co., Richmond; Conquest, Moncure & Dunn Inc., Richmond, general contractor.

STRUCTURAL STEEL PENDING

1000 tons, construction, Navy, Indian Head, Md.; pending.

900 tons, 36th street subway extension, Department of City Transit, Philadelphia; bids Oct. 30.

525 tons, five state bridges, Harvard-Lancaster, Mass.; bids Oct. 23, Boston.

520 tons, six steel stringer bridges, Boxford-Rowley-Georgetown, Mass.; bids Oct. 20, Boston.

500 tons, (estimated) miter gate and appurtenances, McNary dam, Oregon, Willamette Iron & Steel Co., Portland, Oreg., low, $217,525, to U. S. Engineer, Walla Walla, Wash.

500 tons, two technical buildings, Hanford Atomic Works; L. H. Hoffman, Portland, Oreg., low $2,840,000 to General Electric Co., Schenectady, N. Y.

500 tons, also 350 tons reinforcing, machinery, etc., Industrial Way bridge, Tacoma, Wash.; Anderson Bridge Construction Co. and Roy T. Farley Co., Tacoma, joint low bid, $1,342,265.

400 tons, state bridge, Dauphin county, Pennsylvania; bids Nov. 9.

150 tons, additional buildings, State Teachers College, New Haven, Conn., to Fox Steel Co., New Haven; Fusco-Amatruda Co., New Haven, general contractor.

106 tons, armory, Illinois National Guard, Macomb, Ill., to Laclede Steel Co., St. Louis.

100 tons or more, two warehouses, Quartermaster Depot, Richmond, Va., to Virginia Steel Co., Richmond; Conquest, Moncure & Dunn Inc., Richmond, general contractor.

100 tons, Claflin school, Newtonville, Mass., to Northern Steel Co., Medford, Mass.; Tornabene Bros. Co., Newton, Mass., general contractor; 61 tons, fabricated structural steel, West End Iron Works, Cambridge.

REINFORCING BARS PENDING

1900 tons, expansion, Lever Bros. Co., Hammond, Ind.

615 tons, state bridge work, Lancaster county, Pennsylvania; bids Nov. 2.

600 tons, senior high school, Keokuk, Iowa.

600 tons, expansion, Northern States Power Co., Minneapolis.

466 tons, state bridge, Dauphin county, Pennsylvania; bids Nov. 9.

360 tons, state bridge work, Beaver county, Pennsylvania, bids Nov. 2.

350 tons, test cells, Studebaker Corp., South Bend, Ind.

350 tons, Jackson-Laramie apartments, Chicago.

315 tons, five state bridges, Harvard-Lancaster, Mass., bids Oct. 23, Boston.

210 tons, six steel stringer bridges, Boxford-Rowley-Georgetown, Mass.; bids Oct. 30, Boston.

180 tons, building, Universal Oil Products Co., Des Plaines, Ill.

175 tons, Mt. Hood national forest projects, Oregon; Soule Steel Co., Portland, low to Bureau Public Roads.

125 tons, Fairless Works, United States Steel Co., Morrisville, Pa.; bids in.

100 tons, convent and school, St. Agnes Church, St. Paul.

Unstated, housing and other structures, Fairchild air base, Spokane, Wash.; Henry George & Sons and Phil McInnes, Spokane, awarded $2½ million project.

REINFORCING BARS . . .

REINFORCING BARS PLACED

400 tons, laboratory building, Hanscom airport, Bedford, Mass., to Joseph T. Ryerson & Son Inc., Cambridge, Mass.; J. F. Fitzgerald Construction Co., Boston, general contractor.

200 tons, Port of Seattle cold storage warehouse, to Northwest Steel Rolling Mills Inc., Seattle; Noble W. White, Seattle, general contractor.

190 tons, library and law school, University of Toledo, Toledo, O., to United States Steel Supply Co., Chicago.

PLATES . . .

PLATES PLACED

300 tons, marine boiler plate, Navy Purchasing Office, Washington, to United States Steel Co.

200 tons, including shapes, two 165-foot gas and oil barges, to Albina Engine & Machine Works, Portland, Oreg., by Air Force.

165 tons, steel plates, black, Navy Purchasing Office, Washington, to Lukens Steel Co., Coatesville, Pa.

PLATES PENDING

100 tons or more, underground fuel storage tanks, Corps of Engineers, Jacksonville, Fla., Butler Mfg. Co., Birmingham, low, $172,729.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Atchison, Topeka & Santa Fe, ten 1600-hp and fourteen 1200-hp diesel-electric switchers to Fairbanks, Morse & Co., Chicago.

Seaboard Air Line Railway, 10 diesel-electric yard locomotives, to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

RAILROAD CARS PLACED

Great Northern, 1000 freight cars; 950 fifty-ton box cars to own shops and 50 fifty-ton express refrigerator cars to Pacific Car & Foundry Co., Renton, Wash.

Louisville & Nashville, 250 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Transportation Corps, 880 navy munition cars, equipped with Chrysler trucks, to Pullman-Standard Car Mfg. Co., Chicago.

Virginian, 1000 fifty-ton hopper cars, to Bethlehem Steel Co.

RAILS PLACED

Chesapeake & Ohio, 55,354 gross tons of rails, 26,454 tons to United States Steel Co., Pittsburgh, 20,925 to Inland Steel Co., Chicago; 6,194 to Bethlehem Steel Co., Bethlehem, Pa.; and 1785 tons to Algoma Steel Corp., Ltd., Sault Ste. Marie, Ont.

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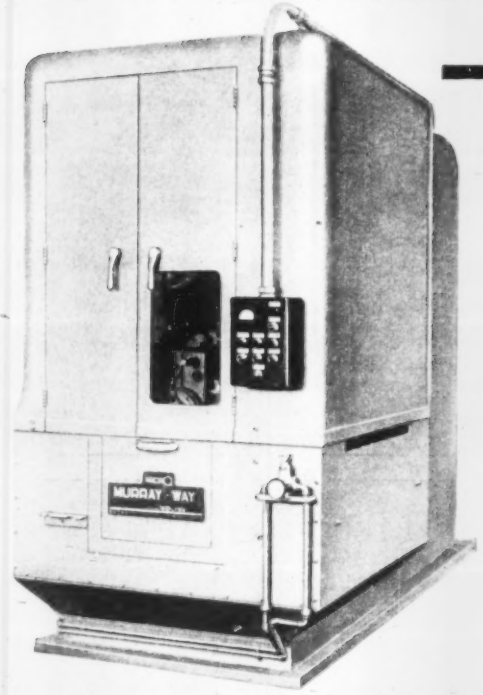

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Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Power Tool Makers Federate

Power Tool Manufacturers' Association was formed with offices at 732 Dupont Circle Bldg., Washington 6. The 10 charter members are: Atlas Press Co., Kalamazoo, Mich.; Boice-Crane Co., Toledo, O.; Central Specialty Division, King-Seeley Corp., Ypsilanti, Mich.; Double A Products Co., Manchester, Mich.; Delta Power Tool Division, Rockwell Mfg. Co., Pittsburgh; Duro Metal Products Co., Chicago; Logan Engineering Co., Chicago; Magna Engineering Corp., San Francisco; Famco Machine Co., Racine, Wis.; Walker-Turner Division, Kearney & Trecker Corp., East Plainfield, N. J. Additional members are Shopmaster Inc., Minneapolis, and Emerson Electric Mfg. Co., St. Louis. President of the association is Myron H. Buehrer, vice president and general manager, Boice-Crane Co.; vice president, Herbert Upton, president, Double A Products Co.

Ferroalloy Plant Opened

Ohio Ferro-Alloys Corp., Canton, O., has placed in operation its new plant at Brilliant, O. The plant consists of three large electric furnaces equipped to produce ferroalloy briquets and other alloy additives used by iron and steel foundries.

AMF Broadens Product Line

American Machine & Foundry Co., New York, purchased Sterling Engineering Co. Inc., Laconia, N. H., manufacturer of electrical relays. Sterling will be operated as a subsidiary with K. A. Killam continuing as president.

American Machine's radial arm saw manufacturing subsidiary, DeWalt Inc., Lancaster, Pa., purchased the complete "Monarch" woodworking machinery line of American Saw Mill Machinery Co., Hackettstown, N. J.

Solar Opens Parts Plant

A new jet engine parts plant was dedicated in Des Moines, Iowa, by Solar Aircraft Co., San Diego, Calif. The new Wakonda plant will manufacture hot end parts for the latest jet engines using techniques that employ the maximum number of automatic machines and assembly line methods. Wakonda's building and machinery represent a total investment of almost $7 million. Solar will procure $4 million of equipment for the plant which will be added to machinery already on hand. Major operations in the plant will include forming, welding, machining, heat treating and assembling.

American Can Opens Plant

American Can Co. dedicated its eighth California plant. Rated capacity of this factory, the second in the Los Angeles area, is 350 million cans a year. A ninth plant is being built in Stockton, Calif.

Capital Steel Will Build

Capital Steel & Iron Co., Oklahoma City, Okla., will build an office building in Houston. A plant is expected to be built later for the fabrication of products in demand in that area. The company produces aircraft hangers, structural steel, fabrications for buildings, bridges, warehouses and cotton gins. The company also serves as a distributor for various steel products.

Banner Opens New Plant

Banner Mfg. Co., Milwaukee, is producing resistance welding equipment in its new plant at 6820 N. 43rd St., that city.

Algoma Awards Contracts

A billet heating furnace and three complete batteries of soaking pits will be built for Algoma Steel Corp. Ltd. at Sault Ste. Marie, Ont., by Rust Furnace Co., Pittsburgh. The furnace will have a capacity of 80 tons per hour and will serve a new combination bar and strip mill. The additional soaking pits will serve a blooming mill, permitting an increase in its rolling capacity.

Pacific Gas Plans Huge Plant

Pacific Gas & Electric Co. plans to build the biggest power plant in California. It will cost $80 million, will generate 600,000 kilowatts, and be 150,000 kilowatts larger in capacity than the combined Shasta and Keswick power installations of California's Central Valley project.

Annual Report Awards Listed

In the Financial World Survey of Annual Reports an independent board of judges decided that Aro Equipment Corp., Bryan, O., manufacturer of air tools, lubricating equipment and aircraft products, had the best annual report of the machine tool industry. Ex-Cell-O Corp., Detroit, was runner-up for the bronze

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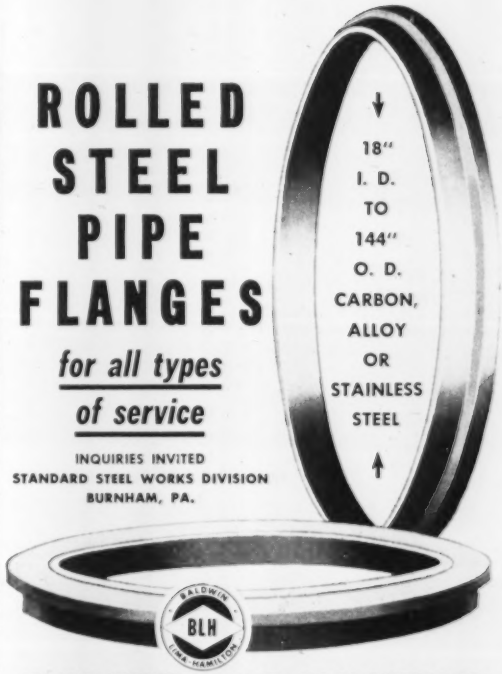

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Last call for the 1951 Defense Bond Campaign!

While the campaign was scheduled for six weeks, beginning Labor Day, the *accounting period* will include all Payroll Savings Plan bond purchases and enrollments in September *and October*.

If *you* haven't conducted a person-to-person canvass to put a Payroll Savings Blank in the hands of every man and woman in *your* company there is still time to join the thousands of companies which have added nearly a million employees to the Payroll Savings Plan through person-to-person canvasses.

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Give your employees an opportunity to save for their future and at the same time, help to maintain America's economic security—put an application blank in their hands.

Results of a few recent person-to-person canvasses

Firestone Tire and Rubber Company (40,000 employees), 87% participation; Universal Atlas Cement Company, 67.8% of 4,789 employees . . . Martha Mills, 71% of 2,200 employees . . . Lit Brothers, 52% of 3,600 employees . . . Delta Air Lines, 65% of 2,100 employees; Aerojet Engineering Corporation, 78.1% of 2,000 employees . . . Brown-Lipe Chapin Division of General Motors, 87% of 1,750 employees; Fabricast Division, General Motors, 85% of 1,700 employees.

Person-to-person canvasses now under way include:

	Number of Employees
38 Major Railroads	993,142
Radio Corporation of America	40,000
Owens-Illinois Glass Company	25,000
Cudahy Packing Company	17,000
Pacific Gas and Electric	17,000
Willys-Overland	6,750
Owens-Corning Fiberglas Corp.	6,500
White Motor Company	6,500
Fruehauf Trailer Company	5,700

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STEEL
The Weekly Magazine of Metalworking

"Oscar of Industry," while Gardner Denver Co., Quincy, Ill., placed third.

Link-Belt Co., Chicago, was judged as having the best annual report of the material handling equipment category. Black, Sivalls & Bryson Inc., Kansas City, Mo., was runner-up for top honors, while Chain Belt Co., Milwaukee, placed third.

Douglas To Build Laboratory

Douglas Aircraft Co. Inc., Santa Monica, Calif., will construct an electronics testing laboratory at its Tulsa, Okla., division. Completion is scheduled by Feb. 1.

United Celebrates 50th Year

United Engineering & Foundry Co., Pittsburgh, is celebrating its 50th anniversary. The company emerged in 1901 as the result of a merger of Frank-Kneeland Machine Co., McGill & Co., Lincoln Foundry Co. and Youngstown plant of Lloyd Booth Co., all rolling mill builders. Chilled Roll Foundry Co. entered the organization of rolling mill builders shortly afterwards. Isaac W. Frank was the first president of the company. The company is still expanding and reported sales of nearly $67 million in 1950.

Plater Converts Machines

Niagara Platers Inc., North Tonawanda, N. Y., is spending about $95,000 for new plating equipment and converting older machines to use substitutes. The conversion will enable the company to substitute copper for nickel as the base plating material for chrome-finished products.

Olympic Industries Expands

Olympic Industries Ltd., Hawthorne, Calif., is adding 20,000 square feet of space for manufacture of aircraft seating, aircraft and automotive parts.

Norton Forms Export Firm

A new company, Norton Behr-Manning Overseas Inc., was organized by Norton Co., Worcester, Mass., and its subsidiary, Behr-Manning Corp., Troy, N. Y. The new company with headquarters in Worcester will handle all of the export business and direct the subsidiary plant operations of these two corporations throughout the world. Herbert A. Stanton is president of the new organization.

Brazil Gets New Industry

B. F. Goodrich Chemical Co., a division of B. F. Goodrich Co., Akron, and S. A. Industrias Reunidas F. Matarazzo organized a manufacturing company, Geon do Brazil. Engineering work is well under way for erection of plants near Sao Paulo, Brazil, having initial production capacity of 6 million pounds annually of Geon polyvinyl materials.

Awards Soaking Pit Contract

Loftus Engineering Corp., Pittsburgh, received a contract for 10 two-pit batteries of two-way top-fired recuperating soaking pits for United States Steel Co. at the new Fairless Works, Morrisville, Pa.

Screw Products Buys Firm

Screw Products Corp. of America, South Gate, Calif., acquired the former Pacific Screw Products Corp., that city. William R. Burlingham is the new president of Screw Products Corp.; B. Deleray Mouron, president, Delron Co. Inc., Los Angeles, is executive vice president.

British MonoRail Organized

A new company, British MonoRail Ltd., was formed by J. P. Lawrence, president of American MonoRail Co., Cleveland. The new company, under chairmanship of Sir John Dodd, Dodd Investments Ltd., Manchester, will manufacture in England all of the specialized monorail equipment now being produced by American MonoRail.

Conoflow Leases Plant

Conoflow Corp., Philadelphia, is opening an auxiliary plant to enlarge its facilities for manufacturing pneumatic control equipment. The leased plant on 21st street, close to the main office and factory, will accommodate the assembly and shipping department.

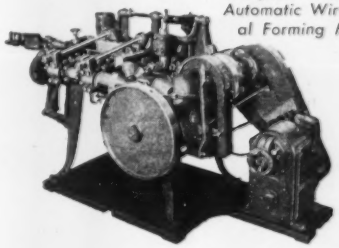
Arcos Appoints Distributors

Arcos Corp., Philadelphia, appointed Clements Welding & Machinery Co., St. Louis, and the R. & R. Welding Supply Co., Des Moines, as its exclusive distributors in their respective districts. Arcos makes stainless low-alloy high-tensile and nonferrous electrodes.

Union Asbestos To Expand

International Rolling Mill Products Corp., Chicago, purchased 100,000 shares of stock of Union Asbestos & Rubber Co., that city. Managements of the two companies will co-operate on a sales and production policy involving an expansion of Union Asbestos' facilities and the addition of new products. Union Asbestos makes insulation materials and steel products. International is a fabricator and warehouser of steel and controls several companies in the metal industry. One of its divisions, Nikoh Tube

Designers and Builders of Automatic Wire and Metal Forming Machinery



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STEEL can put you in touch with the important ones, those that do more than 92% of the industry's business. Tell the buyers and specifiers in these plants of the machines or materials you have for sale through an "Equipment—Materials" advertisement. For rates write STEEL, Penton Building, Cleveland 13, Ohio.

Co., Chicago, producer of electricweld pipe and tubes, mechanical tubing and thin wall conduit, is expanding into the extruded metals field and is installing a large extrusion press.

Chiksan Names Agent

Chiksan Co.—industrial and hydraulic swivel joints and unions—Brea, Calif., appointed Hydrobel, S. A., Liege, Belgium, as its representative in Belgium, Grand Duchy of Luxembourg and the Belgian Congo.

Brush Making Facilities Up

Pittsburgh Plate Glass Co., Pittsburgh, is expanding its power-driven brush manufacturing facilities. A new plant will be completed in about 90 to 100 days.

Howe Scale Moves Branch

Howe Scale Co., Rutland, Vt., moved its Chicago branch to 1915 N. Harlem Ave. Curtis B. Hoffman is manager of that branch.

Buys Chicago Die Mold Mfg.

United States Rubber Co., New York, acquired the assets of Chicago Die Mold Mfg. Co., Chicago custom molder of plastic radio cabinets, dials and other plastic products. The business will be operated as Chicago Die Mold Division, United States Rubber Co. The former owner, E. A. Petersen, will remain as manager. Production facilities will be expanded to manufacture industrial products from its new plastic compounds, Uscolite and Enrup.

New York Central To Build

New York Central Railroad plans to build a $2 million plant in Elkhart, Ind., to service diesel locomotives.

Wilmot Forms New Division

Chain Engineering and Sales Division, devoted to its rivetless chain, has been established by Wilmot Engineering Co., Hazelton, Pa. Along with a regrouping of the engineering staff, to facilitate the handling of conveyor and elevator engineering problems, the following district sales representatives have been appointed: Harold C. Lusk, Pittsburgh; Cross Pump & Equipment Co., Charleston, W. Va.; Crowell Engineering & Sales Co., Knoxville, Tenn.; Jack Van Horn, St. Louis; Amos A. Culp, Birmingham; and International Mfg. & Equipment Co., New York. Establishment of the Chain Engineering and Sales Division followed an extensive program of rearrangement of Wilmot's large foundry, machine shop and patternmaking facilities at White Haven, Pa. General sales management is headed by Harold R. Middleton. Carl S. Jenkins is chief of the engineering department, located at the White Haven plant.

UP BEFORE DAWN: Among the deepest and heaviest girders ever fabricated, this 173-ton haunch girder for the Passaic River Bridge was hoisted into place on top of a 103-foot pier by Bethlehem Steel Co. bridgemen. The girder is nearly 24 feet deep and 130 feet long, with splice material extending an additional 12 feet at each end. Floodlights illuminated the scene of work until sunrise, since the lift was started early enough to take advantage of a high tide at 2 a. m.

Fleck Engineering Co. Moves

Fleck Engineering Co. Inc., manufacturer of an oil filter cartridge, moved from Baltimore, 1619 Fleet St. into larger space at 1631 Filbert St., Curtis Bay, Md.

Lea To Sell Clair Machinery

Lea Mfg. Co., Waterbury, Conn., manufacturer of finishing compositions and equipment, signed an agreement with Clair Mfg. Co., Olean, N. Y., whereby Lea will handle the sale of Clair special polish machinery to plating and finishing plants throughout most of the country.

Safety Clothing Firm Moves

Safety Clothing & Equipment Co., Cleveland, moved to its new factory and offices at 1990 E. 69th St., that city.

Clyde Gets Truck Agency

Automatic Transportation Co. — electric industrial trucks—Chicago, appointed Clyde Equipment Co., Hartford, Conn., as its sales representative for most of Connecticut and central Massachusetts.

COP-R-LOY PIPE-SHEETS

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LA BELLE CUT NAILS

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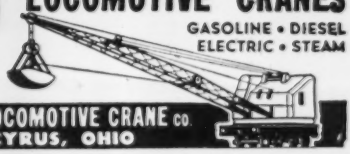
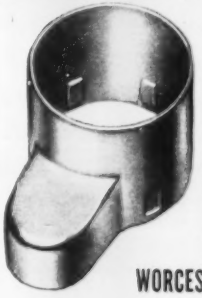


THE OHIO LOCOMOTIVE CRANE CO.
BUCYRUS, OHIO



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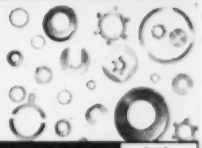

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EST. 1903

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Colburn 54" Vert. Boring Mill, 2 heads.
King 52" Vert. Boring Mill.
Landis 10x24 Type "C" Universal Grinder.
Davis #1 Keyseater.
Aurora 24" Upright Drill, #4MT, tapping.
Defiance #3, Upright Drill, #3MT.
Cincinnati Bickford 3'9" Radial Drill.
Sellers 4T Tool Grinder, motor drive.
Sellers 6T Tool Grinder, late type.
Landis #2 Universal Grinder, cone drive.
Landis 16 x 72 Plain Cylindrical Grinder.
Brown & Sharpe #12 Plain Grinder, reversing mechanism.
Norton 10 x 24 Plain Grinder.
Micro Internal Grinder, Model F.G.
Heald #70A Internal Grinder.
Heald #78 Centerless Internal & Cylindrical Grinder, late type, complete.
Landis #6 Precision Thread Grinder, New 1944.
Nazel 6N Pneumatic Power Forging Hammer.

Niles Bement Pond 84 x 72 x 14' Double Housing, Reversible DC motor drive, box table, 4 heads, electric rail clamp.

Cincinnati 24 x 24 x 6' Double Housing.
Cleveland 26 x 26 x 8' Openside Planer.
Gray 36 x 36 x 12' Double Housing Planer.
Universal 24" Openside Shaper Planer.
Lodge & Shipley 16" x 6', single pulley drive, 12 spindle speeds.
American 16" x 5', 3 SCD, 56" center distance, 1¼" hole in spindle.
Bradford 15" x 8', 3 SCD, 49" centers.
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Lodge & Shipley 20 x 8, single pulley drive, 12 spindle speeds.
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American 30" x 20' centers, 12 speed head, 2-9/16" hole in spindle.
American 36" x 33' center distance, 2⅝" hole in spindle, first class.
American 48" x 10' centers, 2⅝" hole in spindle, first class.
Hall Planetary Style D Miller.
Monarch 16"x10' bed GH Lathe, 8 spindle speeds, 1⅝" hole in spindle.
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LeBlond 23"x12' bed, GE Lathe, 16 spindle speeds, complete with taper attachment.
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3¼"	Rd. 10/12'	4320	1500
5"	Rd. 10/12'	4320	1100

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SHAPERS: 12" Vernon, 20" G & E.

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Hoppers, Covered, All-Steel, 50-Ton & 70-Ton
Hoppers, Twin, All-Steel, 50-Ton, Cross Dump
Hoppers, All-Steel, 70-Ton, Cross Dump
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EXTRA LONG FLAT CARS

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Two Plymouth Diesel-Electric, 45-Ton, Standard Gauge, Type 0-4-4-0, Built 1942
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Experienced foreman for miscellaneous and semi-production steel foundry. Must have thorough knowledge of heat treating. Excellent opportunity for right person. Good salary, insurance, and bonus. State qualifications and expected salary. Location—Detroit area. Write Box 364, STEEL, Penton Bldg., Cleveland 13, O.

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LEADING INDUSTRIAL HEATING EQUIPment designer and builder has openings for qualified draftsmen, estimators, and erection supervisors. For personal interview, please write Box 383, STEEL, Penton Bldg., Cleveland 13, Ohio, stating qualifications and salary requirement.

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Will bend 20' x ¼" to 6' x ¾" Pl.
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Necessary equipment listed below:

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6—Heavy Duty Radials.
2—Betts Lathes with star feed attachment.

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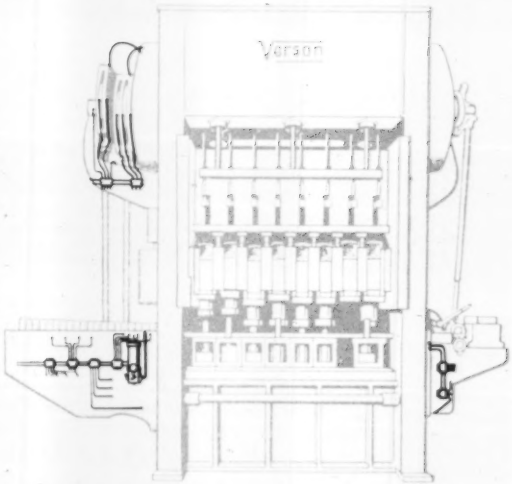
30 million stampings without a bearing failure

...thanks to Farval lubrication

FARVAL—*Studies in Centralized Lubrication* No. 123



With a few strokes of the Farval hand lever, every bearing of this big Verson Transmat Press is adequately lubricated. No stopping the machine, no time lost, and never a bearing missed.

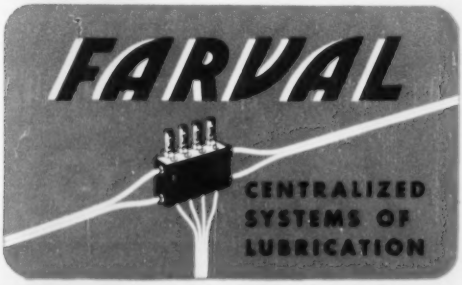
VERSON built and installed this high-speed Transmat Press in a metal-working plant in 1946. It was factory-equipped with a Farval system of Centralized Lubrication. In the five years since its installation, the machine has never been shut down for lubrication, for bearing replacement, or, in fact, for anything other than ordinary preventive maintenance.

The press is used for progressive dieing. Coil stock is fed into the blanking station and then carried by a finger feed for several succeeding operations. It works at the rate of 22 strokes per minute. In continuous operation for five years, this press has turned out in excess of 30,000,000 stampings. By eliminating down time for lubrication and repair or replacement of bearings, Farval has contributed importantly to this impressive output—and should continue to do so for years to come.

Farval is the original Dualine system of centralized lubrication proved practical in over 20 years of service. The Farval valve has only 2 moving parts—is simple, sure and foolproof, without springs, ball-checks or pinhole ports to cause trouble. Through its full hydraulic operation, Farval unfailingly delivers grease or oil to each bearing—as much as you want, exactly measured—as often as desired. Indicators at every bearing show that each valve has functioned.

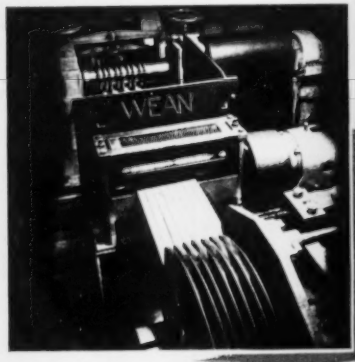
For a full description of Farval, write for Bulletin 25. The Farval Corporation, 3270 East 80th Street, Cleveland 4, Ohio.

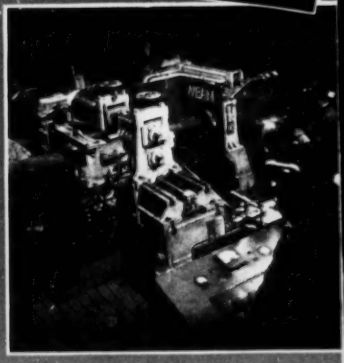
Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

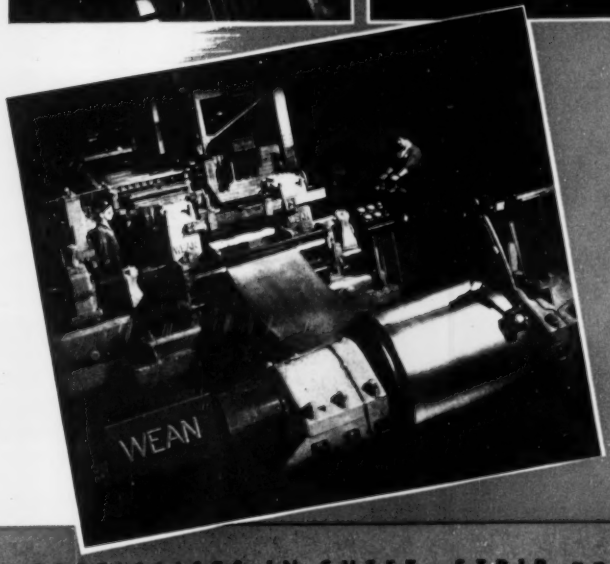


WEAN

SHEARING, SIDE TRIMMING AND SLITTING EQUIPMENT FOR STRIP STEEL







THE WEAN ENGINEERING *Company,* INC.

WARREN, OHIO

SPECIALISTS IN SHEET, STRIP and TIN MILL EQUIPMENT